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ABSTRACT

This report summarizes the final results of project activities to define a discipline-based information system program for the language sciences. The Center for Applied Linguistic's successful efforts to consolidate the relatively large and heterogeneous professional community are described in part one, Cooperation in the Language Sciences. Part two, on the Language Information Network and Clearinghouse System (LINCS), contains an outline of the Center's concrete achievements in defining a flexible program framework for 1971-76, as well as a system concept for improved communication through formal channels, entailing: (1) voluntary collaboration among decentralized information processing efforts; (2) centralized clearinghouse functions utilizing modern automated techniques; and (3) a central source of program guidance and coordination based on the community's continuing advice and mandate. Appendices contain information about further projects related to LINCS. (Author/AM)

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LANGUAGE INFORMATION NETWORK AND CLEARINGHOUSE SYSTEM (LINCS)

AN INFORMATION SYSTEM PROGRAM FOR THE LANGUAGE SCIENCES

Final Project Report
National Science Foundation Grant GN-771
July 1, 1968 - December 31, 1971

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AN INFORMATION SYSTEM PROGRAM FOR THE LANGUAGE SCIENCES

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PREFACE

While the basic importance of information exchange to all language scientists and to all other professionals concerned with language is clearly recognized, channels of communication adequate for the increasing body of information to be carried have not yet been established. The language sciences, given the pre-eminence of language in human experience, occupy a prominent position in the contemporary spectrum of human sciences. The well-documented significance of language in education, communication, health, and general human advancement was emphasized again in a recent public briefing on linguistics in the 1970s, co-sponsored by the Linguistic Society of America and the Center for Applied Linguistics under the auspices of the Smithsonian Institution. With funds supplied by the National Science Foundation, the Center for Applied Linguistics has since 1967 explored the possibilities of comprehensive improvements in the transfer of language information. As a result, a long-range plan for a Language Information Network and Clearinghouse System (LINCS) is now ready for implementation during 1971-1976. The LINCS plan embodies the thinking of both language professionals and information-system specialists, is sensitive to the diverse requirements of language information users, and is designed to yield maximum benefit in those areas of national concern where language is a factor.

The Center for Applied Linguistics is committed to implementing this plan on behalf of the language sciences community within the scope of resources available. In doing so, the Center will collaborate closely with key organizations in the United States and abroad and will coordinate and modify the planned activities in flexible adaptations to changing user needs and to the recommendations of the language sciences' advisory bodies.

William G. Moulton
Chairman, Board of Trustees
Center for Applied Linguistics

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ABBREVIATIONS

AAA	American Anthropological Association
ACL	Association for Computational Linguistics
ACTFL	American Council on the Teaching of Foreign Languages
ADS	American Dialect Society
AFIPS	American Federation of Information Processing Societies
AIP	American Institute of Physics
APA	American Psychological Association
ASA	Acoustical Society of America
ASHA	American Speech and Hearing Association
ASIS	American Society for Information Science
CAL	Center for Applied Linguistics
CFSTI	Clearinghouse for Federal Scientific and Technical Information (now National Technical Information Service)
CIPL	Comité International Permanent des Linguistes
CLI	Committee on Linguistic Information
CLS	Council for the Language Sciences (in planning stage)
COSATI	Committee on Scientific and Technical Information
ERIC	Education Resources Information Center
FID	Fédération Internationale de Documentation
FID/CS	Fédération Internationale de Documentation/Universal Decimal Classification Revision Committee on Languages, Linguistics, Literature
FID/LD	Fédération Internationale de Documentation/Committee for Linguistics in Documentation
LINCS	Language Information Network and Clearinghouse System
LLBA	Language and Language Behavior Abstracts
LSA	Linguistic Society of America
MEDLARS	Medical Literature Analysis and Retrieval System
MLA	Modern Language Association of America
MT/ST	Magnetic Tape/"Selectric" Typewriter
NASA	National Aeronautics and Space Administration
NCTE	National Council of Teachers of English
NFMLTA	National Federation of Modern Language Teachers' Associations
NRSTP	National Register of Scientific and Technical Personnel
NSF	National Science Foundation
RMS	Reference Management System
RECON	Remote Console
SCA	Speech Communication Association
SDI	Selective Dissemination of Information
TESOL	Teachers of English to Speakers of Other Languages
UNISIST	World Science Information System

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SUMMARY

This report summarizes the final results of project activities to define a discipline-based information system program for the language sciences. The project was implemented during the period July 1, 1968 - December 31, 1971, with a National Science Foundation Grant -- GN-771 -- to the Center for Applied Linguistics (CAL).

The results are highlighted under two principal headings. The CAL's very successful efforts to consolidate the relatively large and heterogeneous professional community are described in Part One on Cooperation in the Language Sciences. The outcome of these efforts is significant in three respects. (1) Nine membership societies of key importance have provided strong formal endorsements of the CAL's overall LINCS plan. (2) The CAL has been endorsed as the most appropriate agency to assume responsibility for coordination of the LINCS plan on behalf of the language sciences community. (3) The cooperating societies have declared their willingness to participate in explorations toward a policy-making and advisory body which will provide guidance for LINCS activities.

Part Two on the Language Information Network and Clearinghouse System (LINCS) contains an outline of the CAL's concrete achievements in defining a flexible program framework for 1971-1976, as well as a system concept for improved communication through formal channels entailing

- voluntary collaboration among decentralized, carefully selected information processing efforts;

- centralized clearinghouse functions utilizing modern automated techniques; and

- a central source of program guidance and coordination based on the community's continuing advice and mandate.

The LINCS program is sensitive to the communication needs of 46 subject-oriented reference groups which make up the total user community. Some 350,000 individuals and institutions constitute the current potential clientele for information services and products within the scope envisioned for LINCS.

Under favorable conditions, initial program efforts to be completed by 1974 will concentrate on the most urgent priorities for secondary information processing techniques and services. This will include development of an automated Reference Management System (RMS) and operational testing to determine the economic viability of the most important specialized secondary services with a minimum annual coverage totaling 16,000 units of source information. Among the principal outputs of the RMS will be searchable tapes suitable for dissemination to decentralized information

retailers. Also included will be the development of a minimal network of decentralized voluntary input processing efforts supporting these initial services.

Later measures to be implemented by 1976, will stress technical refinements in secondary processing and comprehensive coverage of the total annual output of the world's publications in the language sciences -- about 60,000 in 1976. A retrospective file of some 470,000 searchable reference units will be maintained and updated in the RMS (1976) and in regional retail centers. These and other refinements will depend mainly on future economic conditions.

Detailed descriptions of specific objectives and findings are presented in the CAL's substantial document Program Plan for an Information System for the Language Sciences: System Acquisition Phase, 1971-1976 (291 pages) which will serve as a flexible overall framework for program coordination and implementation. The Program Plan will be revised periodically. Additional details of a mainly technical nature are presented in 36 LINCS project documents (see References, Part Two). Appendix A of Part Two provides a general guide to the more detailed objectives and findings presented in the existing LINCS documentation.

The Principal Investigators
National Science Foundation Grant GN-771

ACKNOWLEDGMENT

The following individuals and organizations have collaborated during one or more of the program's three initial stages. Albert H. Marckwardt (1971) and John Lotz (1967-1971) have been the program's administrators. In addition to A. Reed Roberts, Robert Freeman (to 1968), and Alfred Pietrzyk, principal investigators, the following staff members contributed substantive or clerical efforts: Susan Anderson, Frederick Bauman, Douglas Campion, Bedrich Chaloupka, Soni Christensen, Steven Christensen, Jerri Dell, Bernarda Erwin, Barry Gilbert, Catherine Hollan, Paulette Hubbard, Laila Khoury, Margaret Kocher, Rita Koozer, Bonnie Krafchuk, Judith Krone, Frances Lamberts, Mary Levy, Kathleen Lewis, Della Maddix, Elizabeth Marckwardt, Ruth McLane, Ludmila Okreglak, Martha Pattillo, Susan Paulus, Janet Prochazka, Patricia Spellman, John Strawborn, Frances Tersillo, Joy Varley, Joan Vis, Carl Wilson, Adam Woyna, Bonni Zarger, Charles Zisa, and Danuta Zyndram. Consulting support for certain tasks was provided by Charles Bacon, Sanford Berg, Katherina Chaloupka, William Creager, Robert DiPietro, Joseph Ebersole, Paul Garvin, Carolyn Gifford, Guiliano Gnugnoli, Kelver Griffith, Donald J. Hillman, Jerry Kidd, Efigenia Lagman, Wilfred Lancaster, Christine Montgomery, Lily Ouyang, Jessica Perry, Tina Pietrzyk, John H. Roberts, Priscilla Rose, Miriam Rappaport, Hedi St. Denis, Virginia Sterba, the Auerbach Corporation, Computer Resources Corporation, Information Dynamics Corporation, Publicate Incorporated, Set Systems, Westat Research Incorporated, the University of Toronto, and various staff members of the CAL's other programs. A helpful dialogue on strategic aspects has been maintained with the National Science Foundation's Office of Science Information Service. Last but not least, crucial advice and support was received from organizations representing the professional community (see Part One) and from numerous individuals in the United States and in other countries.

Special acknowledgement is made to the National Science Foundation for its generous support under grants GN-653 and GN-771.

PART ONE

COOPERATION IN THE LANGUAGE SCIENCES

Prepared and Edited by
A. Hood Roberts

1. Background

Historically, the CAL's information system program for the language sciences resulted from a series of measures initiated by the Committee on Linguistic Information (CLI). This committee represented the language professions and related fields from 1960 to 1967. The CLI's membership in 1967 included James E. Alatis, Verner W. Clapp, Charles A. Ferguson (Chairman), Paul L. Garvin, Eric P. Hamp, Lawrence Krader, Winfred P. Lehmann, Herbert H. Paper, A. Hood Roberts, Thomas A. Sebeok, Allan R. Smith, Harold Wooster, and Sergius Yakobson.

The CLI was originally formed to (1) develop and make recommendations concerning projects for the dissemination of linguistic information, including bibliographic tools, abstracting, translation, indexing, and republication of linguistic literature, and (2) keep informed on international developments in this field in other countries. It developed out of a symposium held under the auspices of the Indiana University Research Center in Anthropology, Folklore, and Linguistics on December 2-3, 1960. In October 1965, the CLI became a committee of the CAL. The CLI's major emphasis shifted eventually to the exploration of problems of system design in the field of linguistics. Its specific objectives were (1) improved information systems in the field of linguistics, (2) better international cooperation in the field, and (3) advising the CAL, and through it the linguistic community at large, on the attainment of the foregoing objectives.

A number of projects were initiated by the CLI, in response to needs of the linguistic community, in the areas of bibliographies, abstracts and summaries, access to documents, manpower information, and basic tools. Among those, the very substantial series, Current Trends in Linguistics [7], published with National Science Foundation support under the general editorship of Thomas A. Sebeok, is especially noteworthy.

In response to a request from the Comité International Permanent des Linguistes (CIPL), the CLI recommended specific measures leading to a CAL project [3] to strengthen and improve CIPL's Linguistic Bibliography [2]. The Linguistic Bibliography is a general-purpose annual reference publication covering the world's literature in linguistics and related fields. With a grant from the National Science Foundation (GN-180), the CAL engaged in intensive activities focused on the Linguistic Bibliography from August 2, 1963 to August 1, 1966. The Linguistic Bibliography project was instrumental in the early conceptualization of the current program.

The CAL's preliminaries toward a language information system were discussed in a three-day conference held at Airlie House, Warrenton, Virginia, during March 1966. A series of papers was presented to 42 representatives of the language and information sciences from the United

States and abroad. The conference proceedings were published by American Elsevier in a volume edited by Freeman, Pietrzyk, and Roberts [1]. The volume includes a first general outline of the LINUS concept [4].

In 1967, the CAL responded to the community's consensus on early measures [6]: it approached the Information Systems Program of the National Science Foundation in order to explore prospects within the Foundation's funding scope for discipline-based information systems. The Foundation responded generously with a first grant of $124,140 (GN-653) awarded to the CAL on July 1, 1967 for preliminary studies within an information system program for the language sciences. Program funding under the Foundation's very substantial second grant totaling $759,[illegible]00 (GN-771 and amendments) began on July 1, 1968. The second grant made it possible for the CAL to define the system acquisition program for 1971-1976.

The CAL has always provided a focus for cooperation among important national and international organizations in the language sciences. The CAL houses the secretariats of the following societies and committees: the Linguistic Society of America, the American Dialect Society, the Association for Computational Linguistics, the Committee on Linguistics in Documentation of the Fédération Internationale de Documentation (FID/LD), the FID Universal Decimal Classification Committee on Languages, Linguistics, and Literature (FID/C8), the International Committee on Computational Linguistics, and the Executive Committee on the Languages of the World.

2. Community Solidarity: Recent Developments

On 1 June 1970, executive officers of a dozen professional societies concerned with language sciences met in Washington to explore ways of improving existing information services. The Chairman of the one-day meeting organized by the Center for Applied Linguistics was Charles A. Ferguson, President of the Linguistic Society of America. The list of attendees reflects the diversity of the language sciences, with representatives from such "hard" sciences as the Acoustical Society of America, a member of the American Institute of Physics, to such humanistic and pedagogically oriented societies as the Modern Language Association of America, the National Council of Teachers of English, and the association of Teachers of English to Speakers of Other Languages. Participants and the societies they represented were: James E. Alatis, Teachers of English to Speakers of Other Languages; Charles A. Ferguson, Linguistic Society of America; Robert Hogan, National Council of Teachers of English; Kenneth O. Johnson, American Speech and Hearing Association; Harry Josselson, Association for Computational Linguistics; Alan Kranz, American Institute of Physics; Kenneth Little, American Psychological Association; John Lotz, Center for Applied Linguistics; Harrison Meserole, Modern Language Association of America; A. Hood Roberts, American Dialect Society; Edward Scebold, American Council on the Teaching of Foreign Languages; Thomas A. Sebeok, Linguistic Society of America; Donald Walker, American Federation of Information

Processing Societies; and William Work, Speech Association of America. Herbert Koller, American Society for Information Science, and Edward J. Lehman, American Anthropological Association, were invited but were unable to attend.

The diversity extended also to the information services provided to their members, ranging all the way from the publication of a journal and a newsletter by the American Dialect Society, to the APA's active publication program, consisting of eight primary journals, a review journal, an abstract bulletin, an employment bulletin, and a directory of members. Despite the diversity, the phenomena of language provided the centripetal force which brought these representatives together.

Ferguson asked those present to consider how the traditions and loyalties of their professional organizations, as well as the existing channels for scholarly communication, could relate to a comprehensive information system. He pointed out that the problems are complex, since the language sciences are not one cohesive discipline, inasmuch as they form a spectrum from the humanistic to the scientific and since the various language areas cut across existing channels of information flow.

General aspects of the LINCS project were discussed. Roberts pointed out that two types of problems must be faced before a comprehensive information system can be acquired for the language sciences. The first problem is organizational and the second is technical. Of these two, by far the most important is the organizational. The present fragmentation which causes duplication of effort and a resultant squandering of the meager resources available to the language sciences can only be overcome through cooperative agreements. These cooperative agreements can come about only slowly and as a result of continuing coordinated efforts. Technical problems involving indexing tools, abstracting guidelines, typographic requirements, thesauri development, file management techniques, etc., are currently being studied and are, fortunately, more susceptible to solution than the organizational problems.

Kenneth Little, Executive Officer of the American Psychological Association, described the Association's activities directed toward the development of an information system for psychology. Alan Kranz, representing the Acoustical Society of America and the American Institute of Physics, reported on the AIP's activities to develop a similar information system for physics. Roberts said that historically the language sciences differed from the APA and the AIP in that the language sciences are diffuse and must build on existing organizational networks. That is, owing to the structure, or lack of structure, in the field, a centralized information system would be undesirable, even if it were attainable. Therefore, the concept of a network, rather than a centralized facility, is what is currently contemplated within the LINCS project. Problems of financing, mandate, and structure were raised, and Ferguson said that if these problems are to be solved it will be as a result of continuing and thorough collaboration by the societies involved.

The Chairman felt it important that the societies make their information needs known to the Center for Applied Linguistics, so that these needs could be taken into account during the design of the LINCS. Furthermore, it was felt to be of importance to involve the societies and their memberships during the early stages of the formulation of any information system in the language sciences. Roberts mentioned that similar channels for liaison with the LINCS have already been established with the member countries of the Council of Europe, the Canadian Linguistic Association, and the Linguistic Society of America, and that other avenues of communication are being explored.

Alan Kranz of the American Institute of Physics and Donald Walker of the American Federation of Information Processing Societies discussed the organization and structure of their societies, emphasizing points of possible relevance as models for a possible similar federation in the language sciences. Ferguson asked the group to respond to the following questions: (1) Is there a community of interest in the language sciences? (2) Do we support a network system as opposed to a centralized system? (3) Should professional organizations take the initiative as opposed to federal agencies or universities? (4) Do we recommend strengthening of existing functioning network nodes?

The reaction to the four questions was affirmative. It was felt that there was a community of interest in the language sciences, that the network system was the one that should be supported, inasmuch as it reflects present-day realities. It was felt that professional organizations should take the initiative, but was also recognized that other organizations not represented should be invited to join in the effort. The strengthening of existing network nodes was felt to be of high priority.

The participants felt that in order that the momentum engendered by this meeting not be dissipated, there should be some means for continuity of discussion. It was therefore decided that the Center for Applied Linguistics should write to all executive officers present, requesting them to lay before the governing bodies of their organizations the problems raised at this meeting, and to request the governing bodies, on behalf of their membership, to approve continuation of these initial efforts at cooperation. It was decided that this group should meet again, at an early date, to discuss further the problems raised here, and the opinions expressed by the governing bodies of their organizations; furthermore, at that second meeting, executive officers might be accompanied by information specialists from their organizations.

As Walker stated in his report to AFIPS: "There was among the participants a recognition of common problems in the information area and a considerable interest in cooperating further. The LINCS program provides a focus as well as a substantial resource."

The following executive officers and other society representatives participated in the second meeting on cooperation in the language sciences at the Center for Applied Linguistics on January 19, 1971: James E. Alatis, TESOL; Eric Hamp, LSA; Douglas Hogan, ASA; Kenneth O. Johnson, ASHA; Harry Josselson, ACL; Herbert Koller, ASIS; Edward J. Lehman, AAA; Harrison T. Messerole, MLA; Kenneth Mildenberger, MLA and ACTFL; A. Hood Roberts, ADS; Gordon Silber, National Federation of Modern Language Teachers' Associations (NFMLTA); Donald Walker, AFIPS; and William Work, (Chairman) SCA. Also invited but unable to attend were Robert Hogan, NCTE, and Kenneth Little, APA.

The purpose of the meeting was (1) to consider the reactions of governing bodies of the organizations represented to the four questions raised at the June 1, 1970 meeting; (2) to discuss LINCS draft proposals to NSF and (3) to discuss guidelines for future procedures to be followed by the meeting participants.

The replies to questions mentioned in (1) above were in principle quite favorable. The LINCS program plan, covering the five-year period 1971-1976, was outlined at the meeting. One preamble and two resolutions were proposed and supported unanimously by all present.

Preamble. James E. Alatis:

There is no question in my mind, and I think I can speak for my Executive Committee, that the LINCS plan can have an unprecedented impact on the problem of communication in the language sciences. However, collective and coordinated action is essential if implementation of the LINCS plan is to begin early enough to do any good (and perhaps my colleagues here cannot speak with such authority for their executive committees as I can at this point). Yet there is a certain amount of urgency.

First resolution. James E. Alatis:

[Motion] That the LINCS plan (or information on it) be circulated to the governing bodies of the associations represented here (or listed) and that these governing bodies be asked for early comments on the LINCS plan and its potential benefits to the language sciences community, including in these comments statements supporting the Center for Applied Linguistics as the responsible agency to represent the language sciences community. These statements should be transmitted to the CAL for transmittal to the NSF. [Additional Comments]. (1) Information on fiscal benefits is desirable toward positive reactions from participating societies. (2) Timing: early measures are recommended because of forthcoming meeting schedules.

Second resolution. Eric Hamp:

(1) It seems that one important step for any advances in such a scheme would consist in the creation of a type of advisory and participating council for the language sciences with a self-selected policy-making governing board -- call it a consortium for coordination in the language

sciences societies -- embracing the full range, call it plus or minus 100 organizations. (2) [Recommendation to] draft a plan involving the societies present, by March 1, 1971. (3) [Recommendation to present draft plan] to executive boards for preliminary consideration. [Reactions] by May 1, 1971. (4) Executive boards to approve and support final plan by June 1, 1971.

In response to these recommendations, the CAL has circulated its LINCS Program Plan [5] document to all organizations represented at the 1970 and 1971 meetings. As a result, strong formal endorsements of the LINCS plan and the CAL as the agency responsible for its implementation were provided by nine cooperating organizations (see Appendix A). Additional endorsements are expected in the near future. A first draft of organizational details toward a council for the language sciences is available for discussion (Appendix B).

APPENDIX A

COOPERATING ORGANIZATIONS: RESOLUTIONS AND STATEMENTS

Key excerpts from correspondence received by Professor William G. Moulton, Chairman of the Board, Center for Applied Linguistics.

ACOUSTICAL SOCIETY OF AMERICA
State College, Pennsylvania

June 28, 1971

At the Executive Council Meeting of the Acoustical Society of America which was held on April 23, 1971, approval was given to a motion passed by the Technical Council of the Society earlier that day which was the result of a recommendation by the Technical Committee on Speech Communication of the Society.

Briefly, the Acoustical Society of America endorses the LINCS plan for 1971-1976 and supports the proposal that the Center for Applied Linguistics be the responsible agency to represent the language science community in the area of information systems for language sciences. In addition, we would wish to participate in explorations aimed at the proposed policy making advisory council of societies in the language sciences. This endorsement does not include a financial commitment on the part of the Society.

Our interests overlap the language sciences primarily in the area of phonetic sciences -- a modest, but, to our minds, significant and dynamic part of the overall language field. The problem of information exchange is an important and difficult one and we are encouraged by the various efforts supported by the National Science Foundation which are aimed at improving such interchange, including LINCS, and the National Information System for Physics and Astronomy of our parent American Institute of Physics.

On the recommendation of the Technical Committee on Speech Communication, I am appointing Dr. Arthur S. Abramson (Chairman, Department of Linguistics, University of Connecticut, Storrs, Connecticut 06268) to participate in the exploration toward the

policy making advisory council and as our representative when it comes into being.

John C. Johnson, President

AMERICAN DIALECT SOCIETY
Washington, D. C.

January 5, 1972

At its meeting on December 26, 1971, the Executive Council of the American Dialect Society adopted the following resolution concerning the Language Information Network and Clearinghouse System (LINCS) plan of the Center for Applied Linguistics:

> The American Dialect Society Executive Council endorses the Center for Applied Linguistics' efforts to improve information services. Having an interest in the entire field of language, not merely that of the study of dialect, the Society is interested in having the Center undertake the establishment and coordination of information services in all the language sciences. The Executive Council is unanimous in its endorsement of the Center for Applied Linguistics as the proper institution to carry out this important activity.

The Executive Council of the American Dialect Society wishes the Center for Applied Linguistics continued success in its LINCS program.

Harold B. Allen, President

AMERICAN PSYCHOLOGICAL ASSOCIATION
Washington, D. C.

April 8, 1971

At its April 1, 1971 meeting, the Executive Committee of the Board of Directors of the American Psychological Association made the following statement regarding the plan of the Center for Applied Linguistics to develop a Language Information Network Clearinghouse System (LINCS):

> The Executive Committee of the American Psychological Association endorses the LINCS plan for 1971-76 and the Center

for Applied Linguistics as being the logical locus for acting as the responsible agent of the language science community for the implementation of that plan. For many years the psychological community has had a strong interest in the language sciences as one of several major foci of interest of the psychological sciences. We view the LINCS plan as providing a means for sustaining and improving information exchange at that point where the interests of psychology and the linguistics sciences intersect one another. The American Psychological Association is willing to participate in informal explorations toward a policymaking advisory council of scientists in the language sciences, to appoint one of its members to act as its representative in this capacity, and otherwise to work to support and improve the transfer of information as it relates to the common interests of the language and behavioral sciences. . . .

Kenneth B. Clark, President

AMERICAN SOCIETY FOR INFORMATION SCIENCE
Washington, D. C.

... On motion, [the American Society for Information Science] Council adopted the following resolution:

> The Council of the American Society for Information Science endorses in general the cooperative LINCS plan for a decentralized information system serving the language sciences, as presented by the Center for Applied Linguistics in July, 1971.
>
> Furthermore, the Council of the American Society for Information Science endorses the suggestion that the Center for Applied Linguistics is the most appropriate agency to assume responsibility for coordination of the LINCS plan.
>
> The Council affirms it willingness to participate in explorations directed toward definition of a policy making body for the LINCS.

Herbert R. Koller, Executive Director

AMERICAN SPEECH AND HEARING ASSOCIATION
Washington, D. C.

March 24, 1971

The Executive Board of the American Speech and Hearing Association has endorsed the efforts of the Center for Applied Linguistics to implement the proposal for a Language Information Network and Clearinghouse System (LINCS). We feel that the LINCS program would be an important step toward meeting the need for communication among nearly 350,000 professionals who are language scientists or have major interests related to the language sciences. Speech pathologists and audiologists who are members of our association are becoming increasingly involved in such language-related areas as social dialects and education, bilingualism, and phonetics. LINCS would be of real service to them.

The Center for Applied Linguistics has consulted with the American Speech and Hearing Association and other concerned professional associations during the process of formulating the clearinghouse proposal. In the LINCS plan it has embodied the thinking of both language professionals and information systems specialists. The Center is a responsible agency which can fairly represent the language science community in this worthwhile project. We will be willing to participate in further explorations toward forming a policy-making advisory council of societies in the language sciences to assist in guiding the LINCS project for 1971-1976.

In short, ASHA hopes the LINCS project will move ahead as planned by the Center for Applied Linguistics, and we offer our support.

Jack L. Bangs, President

LINGUISTIC SOCIETY OF AMERICA
Washington, D. C.

July 31, 1971

. . . At its meeting on July 29, 1971, the Executive Committee of the Linguistic Society of America adopted the following resolution concerning the Language Information Network and Clearinghouse

System (LINCS) plan of the Center for Applied Linguistics; and I have been instructed to pass on to you the sense of the resolution.

> The LSA Executive Committee endorses the LINCS plan as an overall framework for improvements of information services in linguistics and related fields. The cooperative yet decentralized approach of LINCS is particularly appropriate, in view of current funding in our discipline. The plan seems sensitive to the diverse needs of users of language information and adaptable to changing requirements and resources for information processing, retrieval, and dissemination. The Committee also endorses the Center for Applied Linguistics as the agency responsible for coordination of LINCS activities on behalf of the language sciences. The Committee expresses its willingness to participate in explorations toward establishing a policy-making body of societies in the language sciences, which will advise the Center in long-range matters. The LSA Committee on Information and Documentation Services will be glad to offer technical advice to LINCS when specific activities get under way.

Eric P. Hamp, President

MODERN LANGUAGE ASSOCIATION OF AMERICA
New York, New York

May 27, 1971

I am happy to convey to you the resolution of support for the LINCS project voted by the MLA Executive Council at its meeting on 22 May. . . .

The resolution is as follows:

> The MLA Executive Council endorses the idea of a decentralized language sciences information retrieval network and sees merit in the notion that a centralized agency such as the Center for Applied Linguistics coordinate activities, so long as plans and expenses can be kept at a meaningful level and there is a genuine possibility that the service will become self-supporting. The Council expresses its

willingness for the MLA to participate in exploratory discussions which may lead to the establishment of a policy-making advisory board of representatives of relevant professional and scholarly associations which will provide guidance and leadership.

John H. Fisher, Executive Secretary

NATIONAL FEDERATION OF MODERN LANGUAGE TEACHERS ASSOCIATIONS
Buffalo, New York

May 25, 1971

I am happy to inform you . . . that the Executive Committee of the National Federation of Modern Language Teachers Associations has voted support of the proposed Language Information and Clearinghouse System and endorsement of the Center for Applied Linguistics as the responsible agency, representing the language sciences community, in seeking to implement the proposal. . . .

The text of the resolution we have now adopted follows:

> Resolved, That the Executive Committee of the National Federation of Modern Language Teachers Associations supports and endorses the efforts of the Center for Applied Linguistics to implement the project which it has developed for a Language Information and Clearinghouse System and specifically supports its efforts to obtain funding for this program.
>
> That the National Federation of Modern Language Teachers Associations supports the designation of the Center for Applied Linguistics as the responsible agency which will represent the language sciences community in obtaining funds and carrying out the proposed program; and
>
> That the National Federation of Modern Language Teachers Associations records its readiness to take part in informal explorations looking to the establishment of a policy-making advisory council of societies in the language sciences to work with the Center for Applied Linguistics in carrying out the proposed program . . . .

Gordon R. Silber, Secretary-Treasurer

SPEECH COMMUNICATION ASSOCIATION
New York, New York

April 26, 1971

. . . At a meeting in New York City, April 21, 1971, the Administrative Committee of the Speech Communication Association adopted the following resolution:

> It was moved, seconded, and carried that the SCA express its endorsement of the Center for Applied Linguistics as the coordinating agency for a decentralized language sciences information retrieval network, and that the SCA express its willingness to participate in exploratory discussions directed toward establishing a policy-making advisory council of societies in the language sciences.

The Speech Communication Association has followed the development of the LINGS project with considerable interest. SCA participation in it had been recommended by our Committee on Information Retrieval.

Please be assured of our continuing interest and support. . . .

William Work, Executive Secretary

APPENDIX 5

PRELIMINARIES TOWARD A COUNCIL FOR THE LANGUAGE SCIENCES

Articles of Confederation: First Draft

Article I. Name.

The name of this organization shall be the Council for the Language Sciences, hereafter referred to as the CLS.

Article II. Scope and Objectives.

1. The CLS is a non-profit organization representing professional organizations in the United States which share scholarly or practical interests in scientific aspects of language and related problems.

2. The overall objectives of the CLS are:

a. To represent and promote the common interests of its constituent organizations.

b. To provide organizational coordination and direction in cooperative activities of its constituent organizations.

c. To promote closer cooperation among the independent professional societies and related organizations interested in language sciences.

d. To promote public understanding of the national importance of the language sciences.

e. To promote international cooperation in the language sciences.

3. The central mission of the CLS is to function as a national advisory body on information policy in the language sciences.

Article III. Membership.

1. Membership is open to any non-profit professional society, organization, or committee of national scope with an interest in some aspect of the language sciences.

2. Societies and organizations ratifying these Articles prior to their effective date shall be known as Founding Members of the CLS.

3. Application for membership may be made by letter to the CLS Board for Directors.

4. Each application for membership received after the CLS formally comes into existence must be approved by the Board of Directors.

Article IV. Governing Body.

1. The affairs of the CLS are governed by its Board of Directors.

   a. Pending the formulation of an amendment, the Board of Directors consists of one representative from each Founding Member.

   b. Selection of each such Director, term of office, etc., is to be determined by each Founding Member.

2. The Board of Directors shall elect biennially (or on the occurrence of a vacancy), from among its own members -- for two-year terms -- an Executive Committee consisting of a President, President-elect and Secretary/Treasurer, to which it may delegate such authority as it deems proper. Members of the Executive Committee may serve in the same office for only two consecutive two-year terms.

3. The Board of Directors shall meet at least once annually. Each member of the Board shall have one vote. All decisions shall be by simple majority vote unless the Board itself decides otherwise. A quorum shall consist of one half of the membership of the Board plus one.

4. On recommendation from the constituent organizations, the Board of Directors may appoint such executive staff as it deems necessary; the Board may also initiate special purpose committees within the CLS.

Article V. Finances.

1. Principal Support. [Text to be drafted following further consultations.]

2. Other Support. If it proves necessary to raise additional funds to support other functions of the CLS, such funds will be specified in later Bylaws.

3. CLS budgeting and auditing will be subject to periodic discussion between the Board of Directors and the Center for Applied Linguistics.

Article VI. Activities.

The main cooperative function of the CLS will be to act as a national advisory and policy-making body for LINCS. In this capacity, the CLS will (1) strengthen the language profession's solidarity in support of the LINCS program, (2) delegate the language professions' administrative responsibility for the LINCS program to the Center for Applied Linguistics, and (3) advise and guide the Center and its LINCS program in all matters of national information policy and coordination. The LINCS program will, in turn, be held accountable to the CLS concerning all priorities and strategies of national significance.

To this end, the CLS will establish two functional committees: (1) a committee on user needs and information services, and (2) a committee of journal editors.

[Secretariat functions: text to be drafted following further consultations.]

Article VII. Amendments.

These Articles can be amended upon recommendation of the Board of Directors, by affirmative vote of two-thirds of the constituent organizations, each organization having one vote.

Article VIII. Ratification.

This confederation shall come into being upon ratification of these Articles by at least five Founding Members.

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[4] Pietrzyk, Alfred. "A network system for language information: Current conditions and long-range prospects." In: Robert R. Freeman, Alfred Pietrzyk, and A. Hood Roberts, eds., Information in the language sciences (New York: American Elsevier, 1968), 215-229.

[5] Program plan for an information system for the language sciences. System acquisition phase: 1971-1976. Part 1: Program description; Part 2: Appendices. Washington, D.C.: Center for Applied Linguistics, Language Information Network and Clearinghouse System (LINCS), 1971, Part 1: xxi, 220 p.; Part 2: i, 71 p. [NSF Grant GN-771.]

[6] Roberts, A. Hood. "The system of communication in the language sciences: Present and future." In: Carnot E. Nelson and Donald K. Pollock, Communication among scientists and engineers (Lexington, Mass.: D.C. Heath, 1970). [Final version of LINCS report #19-69P.]

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W.; Schachter, Paul, assist. eds.; Vol. 8, Linguistics in Oceania, Bowen, J. Donald; Dyen, Isidore; Grace, George W.; Wurm, Stephen A., ass. eds.; O'Grady, Geoffrey, assist. ed.; Vol. 9, Linguistics in Western Europe, Haugen, Einar; Winter, Werner, ass. eds.; Playlock, Curtis, assist. ed.; Vol. 10, Linguistics in North America, Bright, William; Hymes, Dell; Lotz, John; Marckwardt, Albert H.; Vinay, Jean-Paul, ass. eds.; Vol. 11, Diachronic, areal, and typological linguistics, Hoenigswald, Henry M.; Longacre, Robert E., ass. eds.; Vol. 12, Linguistics and adjacent arts and sciences, Abramson, Arthur S.; Hymes, Dell; Rubenstein, Herbert; Stankiewicz, Edward, ass. eds.; Spolsky, Bernard, assist. ed.; Vol. 13, Index to current trends in linguistics, vols. 1-12.

PART TWO

THE LANGUAGE INFORMATION NETWORK AND CLEARINGHOUSE SYSTEM (LINCS)

Prepared and Edited by
Alfred Piotrzyk

1. Purpose of the LINCS Program

The essential purpose of the CAL's Language Information Network and Clearinghouse System (LINCS) program is to provide a flexible framework for activities of a mainly voluntary nature leading to a comprehensive modern communication system for the language sciences; to improve, reinforce, and coordinate strategic patterns of formal communication existing in the language sciences; and to provide urgently needed innovations. An emphasis will be placed on lasting improvements, economic viability, and systematic voluntary collaboration in national and international network patterns, with resources to be supplied mainly by the cooperating decentralized information efforts. Optimal use will be made of modern information system technologies, including automation, within the constraints applicable to the program.

The CAL's substantial document Program Plan for an Information System for the Language Sciences: System Acquisition Phase, 1971-1976 will serve as a flexible overall guide for program coordination and implementation. Details of specific projects included in the Program Plan will be modified in accordance with new advice from both the community and the National Science Foundation. In fact, the activities covered in current project proposals constitute revised versions of projects proposed in the Program Plan [43].

2. Existing Communication System: Principal Needs

Given the diversity of needs and economic constraints prevailing in the language sciences, the cooperative, mainly decentralized long-range strategy of LINCS constitutes the most effective approach to comprehensive and economical coverage. The proposed Reference Management System (RMS) is indispensable as the focal secondary processing and "wholesale" exchange capability of LINCS: it is needed to provide comprehensive automated coverage for a current annual output of some 54,000 units of source information, including 49,000 publications, of which only some 16,000 units are covered by the established conventional secondary services. The existing secondary services are beset by major problems associated with manual processing, including extensive duplication of inputs. Their economic survival depends crucially on operating economies that will result from cooperative sharing of inputs and modern technologies through the RMS, when it becomes operational in 1973. On the other hand, the established secondary output services must remain decentralized if they are to meet increasing user demands for specialized in-depth coverage. The specialized reference services included in the initial LINCS projects constitute the minimal nucleus essential for effective LINCS operation. Their service objectives are mutually complementary.

Collectively, they are designed to meet the most urgent user priorities for secondary coverage of general linguistics, sociolinguistics, psycholinguistics, language pedagogy, and computational linguistics -- especially in areas of major importance to education, communication, health, and international development.

In more specific terms, the LINCS program for 1971-1976 is designed to meet the following three sets of needs which are articulated in detail in chapter 2 of the Program Plan:

1. Needs connected with the multi-faceted substantive mission -- language -- and heterogeneous community to be served by LINCS.

2. Needs arising from deficiencies in the existing channels and services for formal communication.

3. Needs connected with the current lack of a consolidated economic base for focal information services.

Concerning the first set of needs, the multi-faceted nature of language calls for the establishment of interfaces with information systems in related disciplines and missions -- in addition to intensive coverage of the core fields of general linguistics and linguistic studies of the world's languages and dialects (see section 2.2 and Appendices D and H, Program Plan). LINCS users must be provided with an efficient, integrated, and flexible delivery system for all important items of information within the entire scope of the language sciences, especially in areas which rank high in the scale of national priorities. The considerable social utility of the language sciences has been extensively documented (section 2.2, Program Plan). LINCS must provide a full range of service options specific to the needs of each of its subject-oriented reference groups (see especially section 2.3.1 and Appendix H, Program Plan). LINCS must, moreover, cater selectively to particular needs of the three main categories of language professionals: (1) researchers, (2) practitioners, and (3) other professionals concerned with scientific and technical aspects of language. Communication within and among these categories is currently beset by serious problems (section 2.3.1, Program Plan).

With regard to the second set of needs, channels of formal communication (fig.1) existing in the language sciences are, compared with those of certain other disciplines, in an early stage of development characterized by serious deficiencies. (The complex informal communication system of the language sciences, which involves restricted audiences, will not be perturbed by the program.) Among the main requirements are service improvements designed to enhance the productivity of language scientists and practitioners in terms of reduction of duplicate research, reduction of searching and accessing time, and improved application of language research, especially in socially oriented priorities.

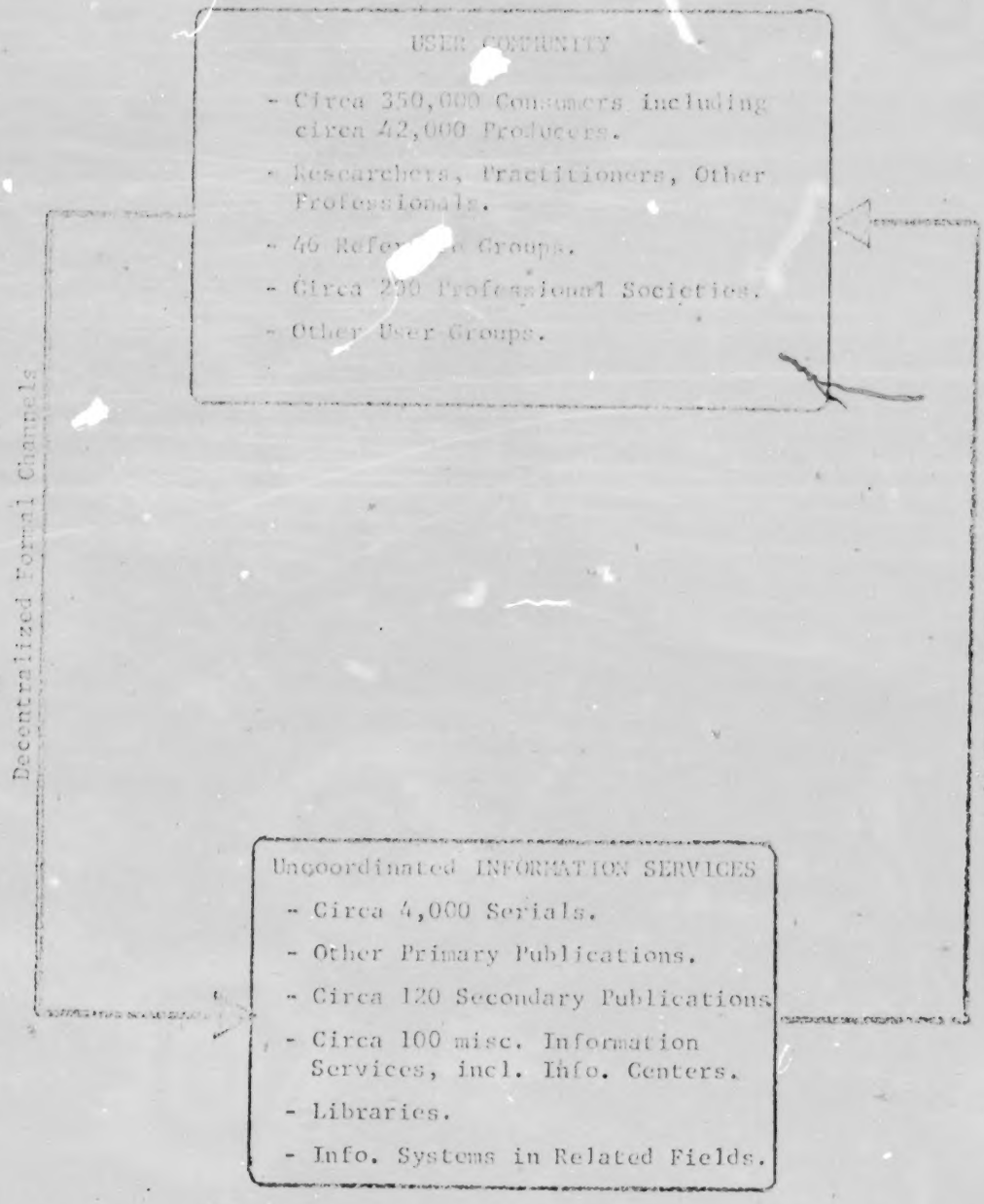

USER COMMUNITY
- Circa 350,000 Consumers including circa 42,000 Producers.
- Researchers, Practitioners, Other Professionals.
- 46 Reference Groups.
- Circa 200 Professional Societies.
- Other User Groups.
Decentralized Formal Channels
Decentralized Formal Channels
Uncoordinated INFORMATION SERVICES
- Circa 4,000 Serials.
- Other Primary Publications.
- Circa 120 Secondary Publications
- Circa 100 misc. Information Services, incl. Info. Centers.
- Libraries.
- Info. Systems in Related Fields.

Fig. 1. FORMAL COMMUNICATION IN THE LANGUAGE SCIENCES, 1971

The need for improvements is especially urgent in the secondary information channels. Only a small fraction of the world's publications in the language sciences is currently under bibliographic control. Some 49,000 (see Tables 1 and 2) publications per annum must be covered, including many items published in "peripheral" journals. Solutions must be found to cope with considerable publication announcement lags: two-year lags are not uncommon. There is, above all, a lack of regionally distributed retail services offering convenient, speedy access to comprehensive data bases. Several kinds of bibliographic, abstracting, and indexing services are needed, including timely comprehensive bibliographies, specialized current-awareness journals, reference guides to research projects, user resources, and language characteristics, and flexible search and dissemination services -- capabilities which, with a few exceptions, do not exist in the form and scope required for the language sciences. The existing secondary information services must be coordinated to eliminate wasteful duplication: cooperative exchanges of information can provide well over 50 percent of the inputs required by the major specialized services.

The third set of needs is connected mainly with the current lack of major income-generating information activities. This is, in turn attributable to the lack of a focal professional organization, the heterogeneous orientation of the community, and a relatively low degree of public awareness of the considerable research and applications potential of the language sciences. Since the envisioned system must become self-supporting, effective economic strategies are needed (see Appendix E, Program Plan), including the currently proposed operational tests to determine the economic viability of centrally important reference services.

3. User Community

The Program Plan contains a detailed characterization of the language sciences community (see section 2.3.1 for a descriptive account and Appendices B, F, and H for additional, mainly statistical details). Some 350,000 individuals and institutions constitute the current potential clientele for information services and products within the scope envisioned for LINCS (Table 3). The estimated total of potential LINCS users in 1976 is 406,460. The following broad categories are included (cf. Appendix F, Program Plan):

Individual users, U. S.	306,230
Institutions, U. S.	13,455
Individual users, foreign	80,740
Institutions, foreign	6,035
Total potential LINCS users, 1976	406,460

Table 1. Serial Publications in the Language Sciences, 1971, By Percentage of Language Sciences Content

	96%-100% (core)	51%-95%	21%-50%	less than 20%	Total
U.S.A.	100	240	300	500	1,140
Foreign	430	530	900	1,000	2,860
Total	530	770	1,200	1,500	4,000

Table 2. Estimated per Annum Number of Message Units in the Language Sciences, 1971 (Including Articles by Serial Groupings, see Table 1)

	96%-100% (core)	51%-95%	21%-50%	less than 20%	Total Articles	Books & Others	Totals
U.S.A.	2,210	4,140	2,400	1,500	10,250	2,560	12,810
Foreign	9,900	9,030	7,200	3,000	29,130	7,270	36,400
Total	12,110	13,170	9,600	4,500	39,380	9,830	49,210

Table 3. Estimated Number of Language Information Users, 1971 *

	Researchers		Practitioners		Others		Totals	
	Producers	Consumers	Producers	Consumers	Producers	Consumers	Producers	Consumers
Individual Society Members, U.S.	6,400	8,000	8,720	87,200	6,400	32,000	21,520	127,200
Other Individuals, U.S.	2,480	24,800	3,600	72,000	4,000	40,000	10,080	136,800
Institutions, U.S.	100	1,200	80	8,000	24	2,400	204	11,600
Individual Society Members, Foreign	1,920	2,400	800	8,000	4,000	20,000	6,720	30,400
Other Individuals, Foreign	720	7,200	400	8,000	2,400	24,000	3,520	39,200
Institutions, Foreign	25	400	30	3,200	16	1,600	71	5,200
Totals	11,645	44,000	13,630	186,400	16,840	120,000	42,115	350,400

* Substantiated in Appendix F, Program Plan [43].

The community consists of three major groups of professionals:

1. Researchers/scholars: research-oriented language professionals including professionals and students in research-oriented higher education.

2. Practitioners: practice-oriented language professionals including language pedagogues at all levels, language students in higher education, translators, and language technologists.

3. Other professionals: professionals in other scientific disciplines related to the language sciences.

Each group consists of information consumers including a subset of information producers. Formal communication (from producers to consumers) takes place among the three groups through nine (3 x 3) possible channels. However, actual use of certain channels is minimal, particularly between researchers and the relatively large population of practitioners (some 186,000 consumers in 1971) -- a serious deficiency in view of the unrealized major applications potential.

Since the existing formal services (e.g. primary and secondary publications) are beset by major shortcomings, the language sciences community is relying heavily on informal channels of communication including personal contacts in "invisible colleges". Among factors contributing to this pattern are the eclectic nature of the language sciences and the multiplicity of language media used in the world's publications on language.

Formal organizational affiliations, commonality of interests in specialized topics, similar work activities, and a significant body of published results account for the clustering of professionals in the language sciences into reference groups. 46 such groups (e.g. general linguistics, phonetic sciences, social dialects and education, bilingualism, English linguistics, French) have been tentatively identified (see Table 4). Formal communication within and among many reference groups is highly deficient. The community is particularly interested in improvements focused (1) on specific needs of given reference groups -- including specialized bibliographies and annual review chapters -- and (2) on an intensive cross-fertilization of all reference groups.

In the United States, the language sciences are organized formally in over 100 professional organizations, many of which are membership societies with a national scope (for a partial listing see Appendix B, Program Plan). The multiplicity and heterogeneous pattern of professional organizations constitutes a natural condition given the diversity of language phenomena. However, this profusion of societies has worked against the emergence of a strong membership organization, or federation of organizations, that could clearly represent the majority of language professionals. Since community solidarity is essential to the coordination of information services, recent efforts were

Table 4. Reference Groups in the Language Sciences, 1976

The 46 user-oriented reference groups listed below have been established on the basis of operational criteria outlined in section 2.3.1 of the Program Plan, including the productivity of published research in given areas. Pragmatic criteria prevail over intellectual and taxonomic principles. Together, the reference groups cover the entire spectrum of the language sciences. The general linguistics group cuts across the entire set of reference groups. However, services in this category will be selective; they will involve, in part, a non-overlapping subset of the total audience. The number of potential LINCS users in 1976 estimated for each reference group includes only those users with a primary interest in the group involved, i.e. all figures listed are non-overlapping. Specific services focused on various reference groups will, of course, be offered to wider audiences. Likewise, the number of message units (articles, books, etc.) expected in 1976 has been estimated in each case only for material of focal interest. Given services will, however, include selections from other reference groups. The reference group concept is dynamic; it will be continuously refined and modified in the light of changing user requirements, advice from the community, and newly evolving research and publication patterns. (For tentative listings of specific subject categories under various reference groups, see Appendix H, Program Plan.)

Reference Group	Total no of users, 1976	Total no. of message units (articles, books, etc.) 1976
1 General linguistics	18,150	2,870
2 Phonetic sciences	9,320	1,680
3 Theoretical and descriptive linguistics	12,870	2,100
4 Lexicology and lexicography	2,365	390
5. Historical linguistics and classical languages	4,830	640
6 Linguistic geography	3,220	960
7 Language and culture	11,590	2,390
8 Social dialects and education	11,020	1,410
9 Language situations and language planning	4,050	790
10 Bilingualism	11,690	1,240
11 Contrastive linguistics	8,000	1,040
12 Foreign and second language education	29,540	3,530
13 Technology of language education	10,215	1,410
14 Language and behavior	13,885	2,780

Reference Group		Total no. of users, 1976	Total no. of message units (articles, books, etc.) 1976
15	Linguistics and medicine	33,355	4,470
16	Linguistics and the humanities	4,730	700
17	Language and automation	12,960	1,660
18	Semiotics	5,210	1,300
19	Translation	15,490	1,600
20	Onomastics	1,160	250
21	French	21,050	2,770
22	Iberian languages	21,400	2,740
23	Italian	3,515	550
24	English linguistics	25,720	3,120
25	English as a native language	28,100	3,940
26	English for speakers of other languages	12,640	1,750
27	German	9,470	1,410
28	Scandinavian	1,475	560
29	Slavic and Baltic	2,005	510
30	Languages of the Soviet Union	2,520	490
31	Russian	6,660	1,080
32	Uralic	960	150
33	Altaic	1,115	150
34	South Asian	1,875	240
35	Southeast Asian	3,290	500
36	Chinese	6,560	1,240
37	Japanese	5,075	950
38	Afro-Asiatic	4,730	810
39	Language of sub-Saharan Africa	6,700	950
40	Malayo-Polynesian	1,250	250
41	Pacific languages	1,245	230
42	Australian languages	1,010	150
43	North American Indian, Eskimo and Aleut	1,915	300
44	South American Indian	2,780	650
45	Pidgins and Creoles	1,245	130
46	Artifical and auxiliary languages	8,505	1,040
		406,460	59,870

focused on effective collaboration among a number of key organizations (see (see Part One, above). Among these, the Linguistic Society of America (LSA) has a membership of more than 6,000 individuals and institutions -- mainly scholars and researchers in the core field of linguistics. Many language teachers in higher education belong to the Modern Language Association of America (MLA) which has some 30,000 individual and institutional members. Among the largest organizations is the National Council of Teachers of English (NCTE) with a current membership of about 50,000 individuals. The average membership overlap among language societies is about 20%. A large portion of the community is not formally organized. The LINCS audience will, moreover, include members of various foreign professional organizations (see Appendix B, Program Plan).

4. Program Goals: 1971-1976

The program will pursue two principal long-range objectives:

1. Improved professional, operational, and economic utilization of basic information services in the language sciences.

2. Improved application of language research.

Within these broad objectives, subgoals have been defined in terms of system consequences for users, system professionals (servicers), and funders (see section 3.1, Program Plan).

5. LINCS: Overall Concept

LINCS will be a world-wide communication system for the effective transfer and processing of formal information in the language sciences and related professions (see sections 3.2, 3.3.1, 3.3.2, 3.3.3, Program Plan). The LINCS concept includes three strategic principles:

- voluntary collaboration among decentralized, carefully selected information processing efforts;

- centralized clearinghouse functions utilizing modern automated techniques; and

- a central source of program guidance and coordination based on the community's continuing advice and mandate.

LINCS and its embedding program system will have three basic design features, in terms of which specific system objectives are defined in sections 3.3.1-3 of the Program Plan:

1. Comprehensive and flexible communication through formal channels (section 3.3.1, Program Plan; fig. 2).

2. An effective structure of centralized and decentralized elements (section 3.3.2, Program Plan; fig. 3).

3. Dynamic functional coordination (section 3.3.3, Program Plan; fig.4).

The three basic design features are mutually complementary. Among the channels of communication, the principal user channels for primary, derivative (secondary and tertiary), and user resources information will provide the most tangible benefits in terms of the long-range objectives, including improved service and operating characteristics involving coverage, speed, selectivity, access, economy, and flexibility. Major structural elements of LINCS will serve as a stable framework for program implementation, operation, and planning. Functional coordination is, in turn, needed for the integration and dynamic adaptation of numerous system elements toward optimal attainment of the specified channel objectives.

Two operationally ready stages of LINCS are envisioned:

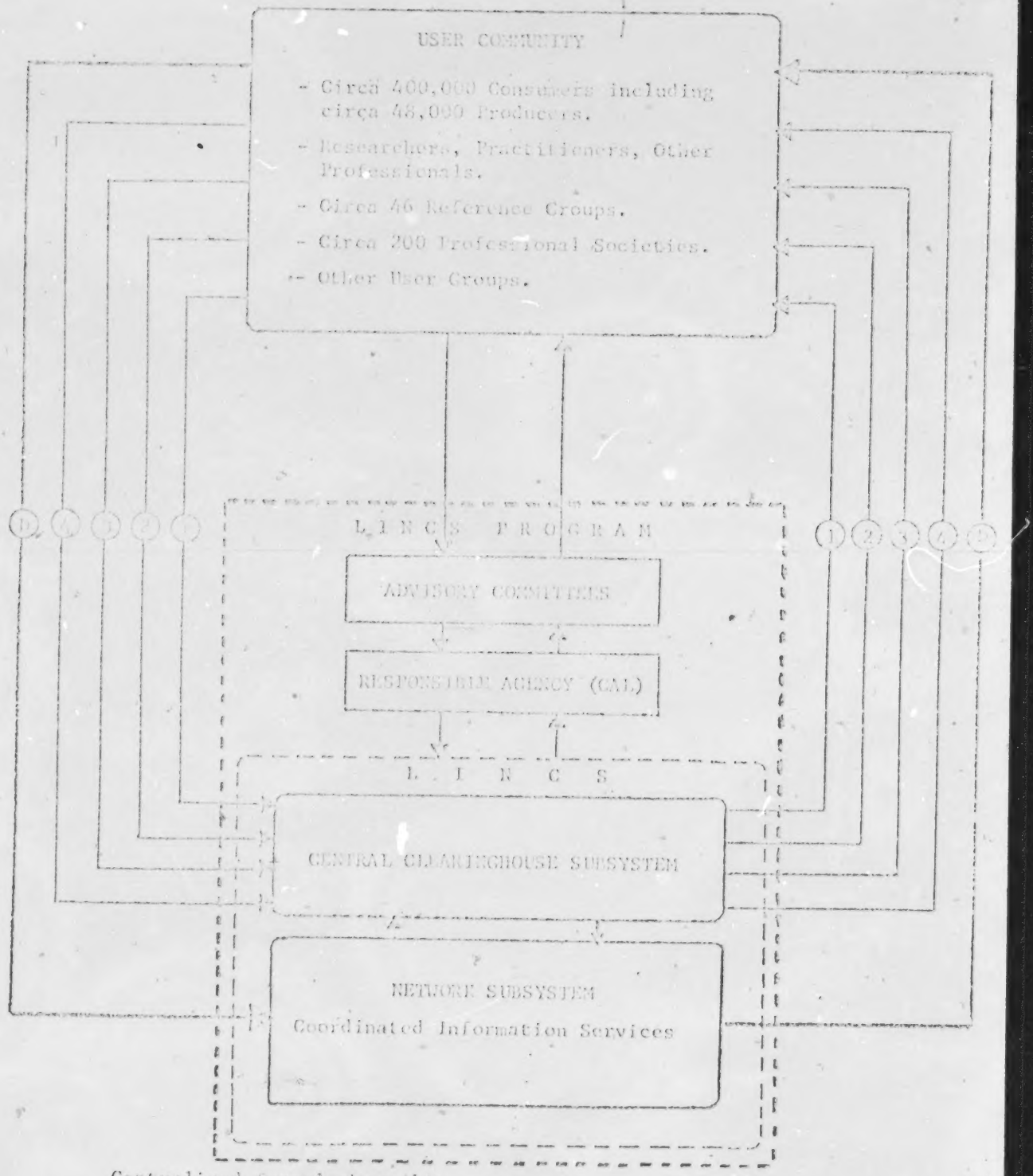
LINCS I: Basic system. Operationally ready by 1974.

LINCS II: Augmented system. Operationally ready by late 1976.

LINCS I (the basic system) will emphasize the most urgent priorities for secondary information processing techniques and services. It will include the operationally ready Reference Management System (RMS) and several economically viable, specialized reference services with a minimum annual coverage totaling 10,000 units of source information. It will also include a minimal network of decentralized voluntary input processing efforts supporting these services. The cooperative network will result from coordinating activities undertaken outside the scope of initial Foundation support.

LINCS II (the augmented system) will include technical refinements in secondary processing and comprehensive coverage of the total annual output of publications in the language sciences -- about 60,000 in 1976. A retrospective store of some 470,000 searchable reference units will be maintained and updated in the RMS (1976) and in regional retail centers. Additional specialized secondary services will collectively cover the entire range of 46 reference groups in the language sciences (see Table 4), with a corresponding expansion of the network of voluntary input processing centers. LINCS II reference processing outputs will be available to some 400,000 users. Other LINCS II improvements will include selected primary and derivative (review) channels within applicable funding constraints.

In the network subsystem of LINCS, allocation of input functions, service objectives, and subject coverage will be adapted to the diverse, naturally occurring infrastructures and patterns of specialization. This will be based mainly on bilateral formal agreements leading to world-wide voluntary cooperation involving the CAL and decentralized institutions which will, for the most part, contribute their own resources. The network will include four categories of decentralized elements: (1) specialized information services


USER COMMUNITY
- Circa 400,000 Consumers including circa 48,000 Producers.
- Researchers, Practitioners, Other Professionals.
- Circa 46 Reference Groups.
- Circa 200 Professional Societies.
- Other User Groups.
L I N C S P R O G R A M
ADVISORY COMMITTEES
RESPONSIBLE AGENCY (CAL)
L I N C S
CENTRAL CLEARINGHOUSE SUBSYSTEM
NETWORK SUBSYSTEM
Coordinated Information Services

Centralized formal channels:

1: Primary information channel.
2: Derivative (secondary and tertiary) information channel.
3: User resources information channel.
4: Societal processing information channel.

D: Decentralized formal channels.

Fig. 2. FORMAL COMMUNICATION IN THE LANGUAGE SCIENCES, 1976

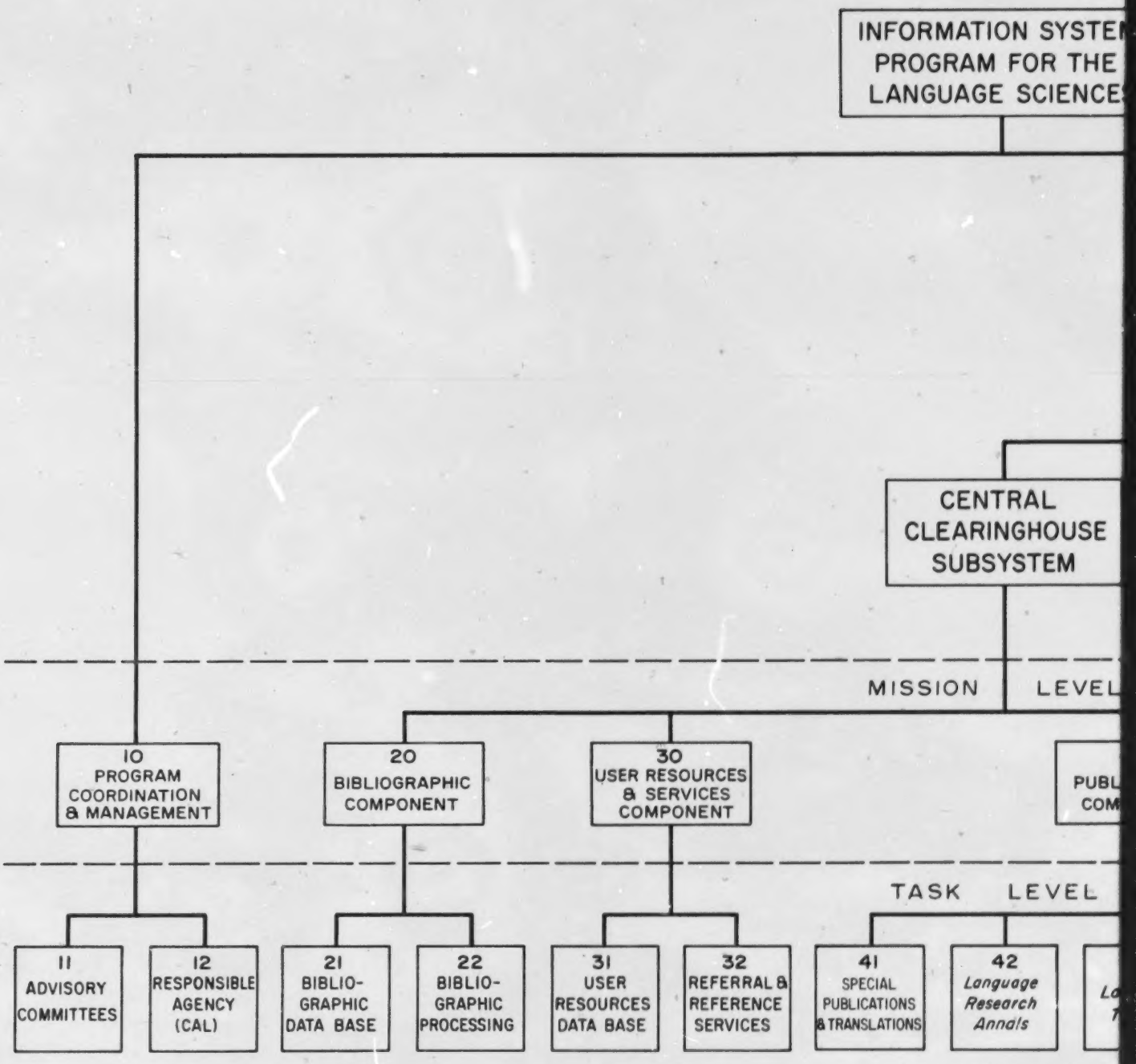
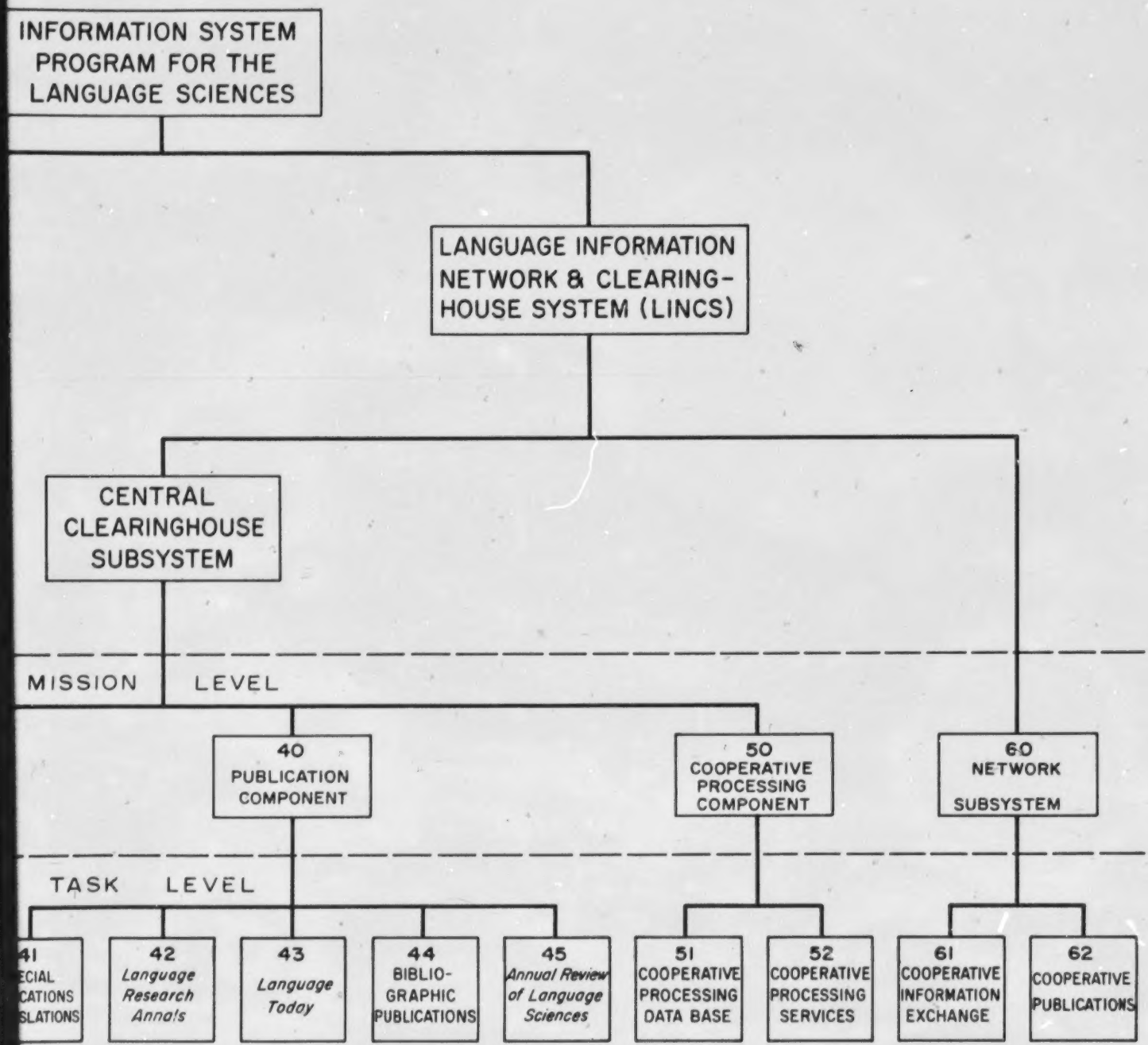
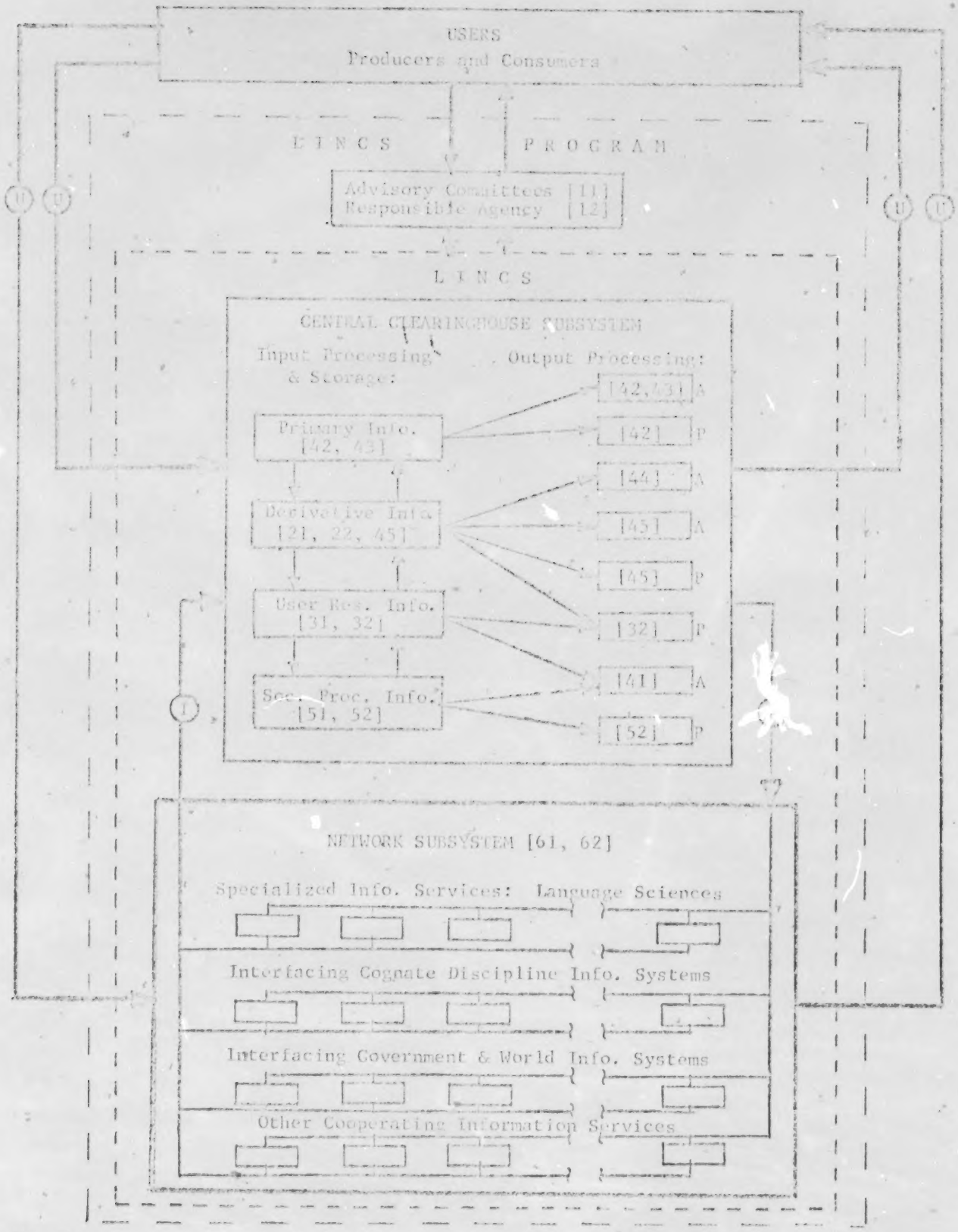


Fig. 3. LINCS PROGRAM STRUCT



. 3. LINCS PROGRAM STRUCTURE



U: Formal user channels (centralized and decentralized).
A: Active outputs (publications).
I: Intra-system channels (cooperative "wholesale" exchanges).
P: Passive outputs (demand, SDI).
[ ]: Task category number (see fig. 3).

Fig. 4. FUNCTIONAL COORDINATION OF LINCS, 1976

in the language sciences, such as primary and secondary journals, libraries, and information and data centers, (2) interfacing cognate discipline systems (e.g. in psychology, physics, computer science, Asian studies), (3) interfacing government and world information systems (e.g. ERIC, MEDLARS, UNISIST), and (4) other cooperating information services. Agreements on standardized formats will render the cooperative network maximally effective.

Through its automated RMS, the central clearinghouse subsystem of LINCS will provide "wholesale" information exchange facilities for the entire network. The RMS will function as a selective relay mechanism (mainly through exchanges of tapes) for the decentralized input processors of reference (abstracting/indexing) information. It will also disseminate comprehensive tapes for reference search services to be offered by regionally distributed information retailers, in addition to functioning as a retailer in its own right.

LINCS will evolve and function within a formally organized, adaptive program which will be accountable to the professional community. The program will provide a flexible framework for the coordination of specific projects such as system development and operational testing (see especially chapters 4 and 6, Program Plan).

6. Value of 1971-1976 LINCS Program

The program's overall objectives -- (1) improved professional, operational, and economic utilization of language information services, and (2) improved application of language research -- will, among other things, lead to primary benefits of immediate importance to LINCS users, as well as to secondary social benefits (see especially sections 5.2 and 5.2.1-4, Program Plan). Tangible benefits will include improved service and operating characteristics involving coverage, speed, selectivity, access, economy, and flexibility.

On the basis of a partial, mostly conservative order-of-magnitude assessment, it is expected that the total quantitative value of LINCS benefits will by 1976 exceed the total cost for the proposed five-year program. The qualitative importance of the envisioned benefits is considerable. Major savings and a significantly enhanced productivity will result for language professionals from the improved formal channels in terms of reduction of duplicate research and/or reduction of the time spent searching and accessing information. It is possible, moreover, to point to the economic consequences of social benefits expected as a result of LINCS coverage of language factors in education, communication, health, and international development. Operating economies resulting from network collaboration and a substantial return (income) on the total investment constitute desirable additions to the cumulative value of the 1971-1976 LINCS program. The estimated cumulative value will be at least $226,980,000. By comparison, the cumulative net cost will be about $4,400,000, of which a substantial portion may eventually have to be covered from sources outside the National Science Foundation. (For a detailed breakdown of the program cost and value, see Table 23, Program Plan.)

There is no doubt that the program's secondary social benefits will be impressive in terms of the economic impact (see section 5.2.3, Program Plan) and qualitative improvements (see especially section 2.2, Program Plan). LINCS will be particularly effective as an information delivery system for language scientists who are active in such socially problematic fields as urban dialects, bilingualism, literacy, and minority languages. The importance of such pursuits was highlighted in President Nixon's proclamation of August 17, 1971, "Year of World Minority Language Groups," which was sponsored by the Congress of the United States.

7. Community Standing

The language sciences community recognizes the Center for Applied Linguistics (CAL) as its agent responsible for LINCS program coordination. The CAL has received strong formal endorsements from nine key professional societies which collectively represent over 35,000 members (see Part One, Appendix A). Endorsements from societies representing an additional 50,000 members are expected in the near future. The community has expressed its considerable solidarity in support of activities defined by the CAL in its 296-page program plan document. The CAL has accepted the responsibility delegated to it by the community. The CAL's readiness to act on behalf of the community results from many years of massive coordinating, clearinghouse, and catalyst activities. The CAL's considerable operational productivity as well as national and international leadership in these areas since 1959 has been extensively documented. Serious community interest in improving the flow of information dates back to the early 1960s (see Part One).

The Center for Applied Linguistics (CAL) is an independent, non-profit institution concerned with language and linguistics. The CAL seeks to achieve its substantive objectives by serving as a clearinghouse for linguistic information; by acting as an informal and impartial coordinating body; by maintaining a reference library; by preparing educational materials; and by conducting basic research. The CAL has served as a model for the establishment of similar institutions in other countries, with which it maintains close contacts. The CAL was established in 1959 as part of the Modern Language Association of America. In 1964, it was incorporated in Washington, D.C., as an independent non-profit institution. The CAL houses certain secretariats including that of the Linguistic Society of America (see also section 1.3 and Appendix A, Program Plan).

The CAL is providing substantial information products and services within its professional scope. The CAL has been particularly active in the area of specialized abstracting, indexing, and clearinghouse services covering socially important language factors (see References, Program Plan). Its newsletter, The Linguistic Reporter, is circulated to some 4,000 domestic and foreign subscribers. Under a contract with the U.S. Office of Education, the CAL operated the ERIC Clearinghouse for Linguistics during

1966-1971. The CAL has, moreover, collaborated with the MLA International Bibliography (Linguistics) and -- with a grant from the National Science Foundation (GN-180) -- with the Linguistic Bibliography of the Comité International Permanent des Linguistes (CIPL).

The CAL's substantial and unique involvement in discipline-wide information system planning for the language sciences is summarized in section 1.4 of the Program Plan. These activities were made possible by two major grants to the CAL from the National Science Foundation -- $124,140 (GN-653) awarded for preliminary studies on July 1, 1967 and $759,600 (GN-771 and amendments) awarded for program definition in installments initiated on July 1, 1968. Activities leading to program definition have concentrated on studies of the user community, its current communication system and service requirements, specification of a system concept, specific system objectives, program implementation planning, indexing and retrieval techniques, and system automation preliminaries including the experimental bibliography Language and Automation. The results are presented in a series of technical reports (see Appendix A and References, Part Two).

8. Commitment and Strategy for Implementation

The community is holding the CAL accountable for program implementation on the basis of an explicitly defined system concept (section 3.2, Program Plan). The CAL has accepted responsibility for implementation of the LINCS program objectives specified in chapter 3 of the Program Plan, and for the subsequent use of assets resulting from the program, toward optimal attainment of the envisioned benefits. This is evident in the CAL's commitment to a detailed implementation plan (chapter 4, Program Plan). The proposed technical approach, planning, and scheduling are realistic and amenable to flexible modification in the light of new requirements. The envisioned program tasks are individually necessary and collectively sufficient. The CAL will make extensive use of its established administrative facilities and organization at the top executive level, for which adequate financial resources are available (section 3.4.3, Program Plan). Community participation will involve the program's advisory mechanism (section 6.1, Program Plan) as well as direct collaboration in specific projects, mostly with the community's own resources.

Acting on behalf of the language sciences, the CAL has developed plans for four specific projects focused on the most urgent priorities within the LINCS program framework:

1. Reference Management System (RMS) for the language sciences: engineering/acquisition. 1971 - 1973 (LINCS project AII, revised; see Appendix B).

2. Operational testing of Language, Society, and Education, a specialized reference serial. 1971 - 1973 (LINCS project BIIa, revised; Appendix C).

3. Operational testing of Language and Automation, a specialized reference serial. 1971 - 1973 (LINCS project BIIb, revised; Appendix D).

4. Operational testing of special information directories for the language sciences, 1971 - 1973 (LINCS project Bible, revised; Appendix E).

Additional plans have been prepared by cooperating organizations for two equally urgent projects:

1. MLA International Bibliography/Linguistics. Modern Language Association of America (see Appendix F).

2. Language and Language Behavior Abstracts. University of Michigan (see Appendix G).

The six initial projects proposed by the CAL, the MLA, and the University of Michigan constitute focal components of the overall strategy for progressing from the existing uncoordinated information services to the comprehensive world-wide communication system -- LINCS -- conceptualized in the Program Plan (chapter 3). RMS development will proceed concurrently with operational testing of priority secondary services. Operational testing will be undertaken in separate projects using existing partial capabilities for automated processing. On January 1, 1974, when the RMS becomes operational, automated processing of all operationally tested and viable CAL secondary services will be transferred to the new RMS environment. In fact, the economic viability of the operational RMS in 1974 will depend to an important extent on the degree to which the system can be utilized in conjunction with self-supporting secondary services (Appendices C - E). The services included in initial projects for operational testing will satisfy the most urgent needs for secondary coverage in the language sciences (see "Existing Communication System: Principal Needs," above).

The concrete goal of the initial program strategy is LINCS I, the basic communication system of the language sciences, which will be operational in 1974 (see Chapter 3, Program Plan). The principal objective will be a "wholesale" capability based on the RMS as the focal automated clearinghouse of LINCS I. Both tape dissemination to selected retailers and cooperative exchanges of secondary information among input processing organizations will be effected through the RMS. The initial strategy for LINCS I provides for voluntary cooperation based on stable bilateral input exchange agreements between the CAL and a number of carefully selected input processors throughout the world including, minimally and most importantly, the MLA and the University of Michigan. The CAL as the community's responsible agent will act as a catalyst and coordinator for these agreements -- an activity which will be undertaken outside the scope of projects currently proposed for implementation. In view of the progress made thus far, the prospects for a successful outcome of the envisioned network collaboration, including substantial operating economies, are excellent.

Under favorable conditions, additional goals will be implemented mainly in activities leading to LINCS II, the augmented system which will be operational by 1976 (Chapter 3, Program Plan). The primary information channels will be strengthened through a development of two serial publications of key importance: Language Research Annals and Language Today. Language Research Annals will be an innovative scientific journal system for articles on research and theory in the language sciences. It will consist of a journal for extended article summaries, a capability for selective distribution of separates (full articles), and the archival bound Annals containing the year's entire article output. Promptness, high-quality editing, and innovative operating features will be stressed. Language Today will be a wide-interest professional periodical designed to communicate current research findings across sub-disciplines and, especially, out to areas of potential application -- in terms understandable and of interest to practitioners and professionals in other fields. The derivative (secondary and tertiary) information channels will be further improved. A number of specialized reference publications will be added. The bibliography data base will be used to support an innovative review system, the proposed Annual Review of Language Sciences. Evaluative annual review chapters covering major subfields of the language sciences will be available collectively in a bound volume as well as individually for selective distribution. The user resources information channels will concentrate on individualized referral and reference services for users seeking information in such areas as document availability, current research, information services, research and teaching organizations, and language characteristics. The services offered through principal user channels will be augmented through the outputs of a cooperative societal processing information channel -- mailing lists, subscription fulfillment, membership information, employment information, and communication among societies.

9. Program Resources

Chapter 6 of the Program Plan contains a detailed description of the organization, personnel, and facilities envisioned for the LINCS program and its specific projects. During 1971-1976, LINCS projects will be coordinated by (1) advisory committees representing the language professions, (2) the CAL's governing body and administration, and (3) LINCS program management. Specific organizational aspects will be adapted to changing needs and policies.

A national advisory council representing key membership organizations in the language sciences will be formed (Part One, Appendix B), with secretariat services to be provided directly by the CAL. Intensive preparations toward this goal have been under way since June 1970. In its role as the responsible agency, the CAL will be held accountable to this council with regard to all information policies of national significance, including the optimal use of assets resulting from the program.

The CAL's director (or acting director) will continue to function as chief administrator of all LINCS projects. He is responsible to the CAL's Board of Trustees (Program Plan, Appendix A) for all administrative and fiscal actions taken by the LINCS projects. The director also provides the principal point of contact with the community and the Foundation. The CAL accepts responsibility for utilizing the assets resulting from the program toward optimal realization of the projected benefits. Routine administrative and fiscal details such as bookkeeping, auditing, rental, purchasing, salaries, and accommodations will continue to be dealt with by the CAL's treasurer who will use the CAL's established facilities. The CAL's secretary will provide specific corporate guidance.

When the first projects are funded, LINCS activities will constitute a separate CAL area to be managed by a LINCS coordinator and directors of specific LINCS projects. LINCS management will be responsible to the CAL director/program administrator.

All LINCS projects will have access to a number of well-established CAL resources in other operations, including the CAL's library, publication section, and ongoing clearinghouse activities of several research projects in the language sciences.

APPENDIX A

LINCS PROJECT OBJECTIVES AND FINAL RESULTS: A SYNOPSIS

The following project phases of the CAL's Information System Program for the Language Sciences have been completed: (1) Preliminary Phase (Stage 1, Survey and Analysis, July 1, 1967 - October 19, 1968) and (2) Program Definition Phase (Stage 2, System Design, July 1, 1968 - December 31, 1969; Stage 3, Advanced System Design, July 1, 1969 - December 31, 1971).

Preliminary Phase (Survey and Analysis, Stage 1): NSF Grant GN-653

During the Survey and Analysis Stage (Stage 1, 1967-1968), the two principal objectives were (1) to conduct a series of surveys and analyses of the existing information system as a first prerequisite to long-range information-system planning, and (2) to study priority components of the future information system, with an emphasis on indexing tools and system automation. Objective (1) was implemented with an emphasis on descriptive and statistical data required toward an operational definition of the user community and its information channels, including a limited sampling of communication behavior among language scientists. The data collected indicate that the existing communication system in the language sciences is sizable in terms of both the population and the literature. Objective (2) emphasized technical characteristics of published information. About 2,500 terms were collected from indexing tools and classifications dealing with interdisciplinary aspects of language. An interim bibliography of over 70 dictionaries of linguistic terminology was compiled and 69 computer-based file-management software systems were listed as possible candidates for further study. Stage 1 yielded several technical reports [1, 2, 3, 5, 6, 7, 8], including a comprehensive report by Freeman, Pietrzyk, and Roberts [4].

Program Definition (System Design, Stages 2 and 3): NSF Grant GN-771

The System Design Stage (Stage 2, 1968-1969) emphasized the following two major objectives: (1) continued study of the existing information system and determination of the constraints on a feasible set of configurations for a Language Information Network and Clearinghouse System (LINCS), and (2) studies of indexing tools and related system automation aspects fundamental to the development of priority components of LINCS upon which subsequent technical system design decisions may turn with safety.

Objective (1) emphasized formulation of LINCS service objectives. The user community was studied from several points of view. Questionnaires of the National Register of Scientific and Technical Personnel (NRSTP) of the National Science Foundation were examined to produce a description

of the core group of the language sciences community. Other activities focused on a descriptive list of societies related to the language sciences, meetings sponsored by these societies, and overlap in society membership. Certain behavioral studies of the user population were attempted, including a limited sampling of active linguists, a survey of information practices among members of the Linguistic Society of America, and an "unobtrusive measure" of communication patterns in linguistic literature citations. A case study covered representative language sciences activities in the Washington, D.C. area and the people carrying them out. The procedures used included questionnaire and interview studies of individual language scientists, a survey of the activities and facilities of selected representative organizations, and an analysis of statistical data for D.C. area respondents to the NESIP questionnaire. The study sought to determine the scope of the language sciences in the Washington area, the relation between the various disciplinary areas which constitute the language sciences, in terms of personnel and lines of communication, the number and identity of those people most actively using the various media of communication, and the variables which most directly affect their choice of these media. Many of the findings are considered to be applicable to the language sciences in the country as a whole. A separate study of LINCS design alternatives provided a conceptual framework and rationale leading to the choice of a cooperative, adaptive, partially decentralized network system as the optimal solution.

The subgoals of Objective (2) included preliminary principles for the construction of a comprehensive thesaurus for the language sciences, criteria for the selection of a file-management system for LINCS, and data on document characteristics and typographic requirements.

The results of Stage 2 are described in a set of technical reports [9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 30, 32]. In addition, general aspects of the program at the end of Stage 2 were presented by A. Hood Roberts to the 1969 Johns Hopkins University Conference on Communication among Scientists and Engineers [44].

The Advanced System Design Stage (Stage 3, 1969-1971), which began on July 1, 1969, has concentrated on the following major and minor objectives. Because of certain budgetary limitations prevailing during Stage 3, system design has focused mainly on macroanalytic features.

A. Main goals for program definition (Project A).

1. Macroanalytic data on the operational requirements (user needs, etc.) of the current communication system in the language sciences (Task A.1).

2. Definition and specification of an optimal system concept for LINCS, as well as a comprehensive plan for the systematic implementation (system acquisition) of this concept (Task A.2).

3. A set of program management capabilities, including program management information, community advisory functions, and arrangements for a managerial and technical cadre and for advance planning (Task A.3).

B. Priority subgoals for system concept definition (Project B).

1. Initial development and planning of indexing and retrieval techniques for the language sciences (Task B.1).

2. Macroanalytic data on the costs, performance and technical characteristics of the major automated components of a future LINCS (Task B.2).

3. Macroanalytic data on the costs, performance, and technical characteristics of three important publication subsystems -- a demand publication subsystem for articles, a secondary publication subsystem, and a review publication subsystem -- including a limited prototype study and experiment under operational conditions (Task B.3).

Task A.1 has produced a coherent pattern, including significant data characterizing the existing communication system of the language sciences (formal and informal channels) and, especially, its operational requirements (information producer and consumer needs, service deficiencies, etc.). The more significant results of Task A.1 are presented in sections 2.3, 2.3.1, and 2.3.2 of the Program Plan [43].

Task A.2 covered the primary architectural effort leading to the LINCS design and construction plans. The specific objectives of Task A.2 have been to provide an operationally meaningful formulation of LINCS service objectives, a specification of the LINCS concept, subsystems, and major components, a detailed provisional specification of LINCS sub-system design elements, and a detailed plan for LINCS implementation and transitional operation. Throughout this effort, there has been frequent and active communication and interaction with the other task efforts and with the community, both to gather base line data for system planning, and to determine the validity and feasibility of possible system alternatives. The major results of Task A.2 are embodied in the main portions of the Program Plan, especially in chapters 3, 4, and 5.

The subgoals of Task A.3 have been to provide or plan for an effective communication and control capability for program management, professional community advisory functions, an adequate managerial and technical cadre, and advance planning. Among the more significant results, the successful efforts toward greater community solidarity are especially important (see Part One, this report). Other results of Task A.3 are included in various sections of chapters 3, 4, and 6 of the Program Plan.

The subgoals of Task B.1 have been (1) preliminary development of a comprehensive thesaurus for the language sciences, (2) exploration of document-indexing approaches, (3) study of indexing-tool management and updating problems, and (4) preliminary exploration of retrieval techniques. The proposed approaches emphasize the requirement that the indexing and retrieval subsystem must serve the users of LINCS in a useful, realistic, and efficient manner, within reasonable economic constraints. Standard techniques will be used wherever they are found to be appropriate. (Cf. section 4.3.2, Mission 20, Program Plan.)

Task B.2 has been oriented toward macroanalytic conceptual and cost/performance specifications for the automation of functional processing components, including file-management approaches, for LINCS. The entire range of system functions from input to processing and output has been studied to determine the optimum choices among several alternatives for automation. The emphasis has been on the processing of bibliographic and other formatted records (cf. especially section 4.3.2, Mission 20, Program Plan).

Task B.3 has concentrated on the definition of publication subconcepts for articles, secondary publications, and reviews as a prerequisite to the principal LINCS design activity (B.2). In addition, B.3 has provided an experimental (operational) environment in the form of a prototype reference publication, Language and Automation [40]. Modern techniques, including photocomposition, have been used in the design and operation of the prototype subsystem. The Language and Automation experiment has been particularly successful in its efforts to interact with a prototype network of cooperating institutions in the United States and a number of other countries (cf. section 4.3.2, Mission 20, and 4.3.6, Mission 60, Program Plan).

Additional results of Stage 3 are presented in separate technical reports [31, 33, 34, 35, 36].

APPENDIX B

THE LINCS REFERENCE MANAGEMENT SYSTEM, 1974

Proposed Objectives

The proposed Reference Management System (RMS) will provide the language sciences with automated secondary information processing facilities of lasting value -- with comprehensive coverage and significant improvements in terms of speed, selectivity, access, economy, and flexibility. The RMS, which will be operated by the CAL on behalf of the community, will be ready for processing operations beginning January 1, 1974. The initial RMS capability in 1974 will be designed to provide least-cost secondary information processing appropriate to the needs of LINCS I, the basic communication network system for the language sciences envisioned in the Program Plan (Chapter 3). Since LINCS will interface with other national and international communication systems, RMS operating characteristics will be compatible with important requirements outside the language sciences.

The RMS will be designed to perform pivotal functions as the central secondary processing and "wholesale" capability of LINCS: the RMS will process and store single recordings of reference information units (entries) for multiple use in retrieval, dissemination, and publication. This information will be maintained (edited, scored, and updated) in a single integrated data base. The computerized data base will consist of several interrelated files containing abstracting/indexing (bibliographic), current research, language characteristics, and directory materials. In principle, the RMS capacity for current processing and storage in 1974 will be sufficient for secondary coverage of the entire annual output of eligible source information -- some 54,000 units including 49,000 publications of primary interest to the language sciences. Actual volumes of RMS usage in 1974 will depend partly on the degree to which vital secondary services can be rendered economically viable. Minimally, the operational RMS will be economically viable in 1974 in conjunction with those abstracting/indexing and bibliographic services which will become self-supporting by 1974 (see current proposals of the CAL, the Modern Language Association of America, and the University of Michigan, for operational testing of secondary services which collectively cover some 16,000 information units per annum).

The "wholesale" function design of the RMS will be crucial. It will provide for:

- comprehensive tapes for distribution to selected regional information retailers;

- an off-line capability for information exchange among decentralized cooperating input processing organizations;

an economical computer-based secondary processing and publication capability available to cooperating organizations on a cost-shared basis.

The RMS "wholesale" function will be designed with a view to economic benefits in addition to substantial cost reductions to regional information retailers, as well as operating economies based on massive, quality-controlled information inputs (in exchange for RMS outputs) from decentralized collaborators. (By 1976, a major part of the RMS input will be derived from decentralized sources within the LINUS network; coverage of the language sciences will then become comprehensive, with a resulting unique, retrospective accumulation of some 470,000 annotated bibliographic records.)

In 1974, regional information retailing and cooperative linkages will involve RMS "wholesale" operations only on a limited pilot basis. The project outcome will, however, include technical and economic specifications for expansions of the operationally ready "wholesale" function, with resources to be provided by information retailers and cooperating input processors.

In 1974, the RMS will also be operationally ready to process the CAL's own substantial retail outputs involving major national information priorities. This will include regular operation of abstracting/indexing and other reference publications, as well as interactive (on-line) search and retrieval of references as a pilot operation. The CAL's direct involvement in RMS retail operations will strengthen its role as the community's responsible agency: the CAL's retail operations will serve as a prototype for the decentralized reference operations within LINUS.

The operational RMS will be equipped with a computer-aided authority file capability with dynamic updating characteristics. Its principal function will be vocabulary control in indexing, retrieval, and tape dissemination. The main tool will be a comprehensive language sciences thesaurus structured in accordance with COSATI guidelines and containing about 5,000 unique descriptors (technical terms) and 5,000 unique language and dialect names.

The RMS will consist of the following seven interfacing, operationally ready system modules (Figs. 1, 2):

1. Input Processing/Unit Record Generation (Fig. 3).

2. Internal Processing/Reference File Maintenance (Figs. 4a, b).

3. Output Processing/Tape Dissemination (Fig. 5).

4. Output Processing/Search and Retrieval (Fig. 6).

5. Output Processing/Publication (Fig. 7).

6. Authority File Component (Fig. 8).

7. Communication/Control (Fig. 9).

The design of each module will be open-ended to permit later additions of such capabilities as retail selective dissemination of information (retail SDI is not included in RMS 1974).

Modules 1-5 constitute the main secondary processing subsystems. Inputs from both centralized and decentralized sources will be processed in Module 1. Input operations will consist of batch processing, keyboarding, and entry of standardized machine-readable inputs from decentralized sources (RMS 1974 does not include conversion programs for non-standard input formats). Module 2 -- the heart of the system -- will consist of two major components: computer-based input/edit and storage. The input/edit program will be designed to minimize human editing and validation efforts in recurrent editing cycles. A merge program will merge all inputs with the short-term data base in the storage component which will also have an archiving function for long-term storage. Module 3 for tape dissemination to information retailers and decentralized input processors will extract and reformat data accumulated in long-term storage. The tapes will have a standardized format. Module 4 will provide interactive on-line search and retrieval with flexible multipurpose software such as NASA's RECON. Data accumulated in the RMS data base (Module 2) will be retrievable in this subsystem. Module 5 will extract reference data from both short-term and long-term storage, for index preparation, sorting, assignment, and editing, for diverse reference publications such as issues of specialized abstracting/indexing serials, non-recurrent bibliographies, inventories, and directories. The final output of Module 5 will be in the form of tapes containing both reference data and typesetting information, ready for use by an external photocomposition system.

Module 6 has a system-wide function in the sense that it will provide (1) tools for vocabulary control -- including thesaurus control -- in human indexing at the input processing stage (Module 1), (2) a means for automated validation of broad and auxiliary terms needed in reference file maintenance (Module 2), (3) thesaurus control needed in tape dissemination (Module 3), (4) thesaurus control needed in the formulation of search strategies (Module 4), and (5) vocabulary control needed in the preparation of publication tapes (Module 5). The internal function of Module 6 will be to generate, update, edit, and display machine-readable authority files including a thesaurus, a broad-term file, and an auxiliary-term file. The 1974 version of Module 6 will rely on human efforts for initial term generation, validation, and structuring. (The module design is open-ended to permit later additions of machine-aided techniques.)

Module 7 will afford a seamless, low-cost automatic control over the production (computer processing) operation in Modules 2, 3, and 5, and in the file management/search interface of Module 4. The need for human efforts and skills in the EDP control function will thus be significantly reduced. Module 7 will produce an automated report generator for production control and statistical summary-type management reports essential to the effective management of all ANS modules.

The payroll version of the project in 1976 will be an operationally ready, documented set of subprograms, procedures, and personnel whose combined functions will be to provide automated software management of local manpower to the level of evidence. The following sections contain additional details of the seven operational subsystems (modules) of the ANS, its hardware and software specifications for 1976, initial data files in 1976, EDP operating personnel, and system documentation.

Fig. 1. LINCS REFERENCE MANAGEMENT SYSTEM (RMS). GENERAL CONFIGURATION

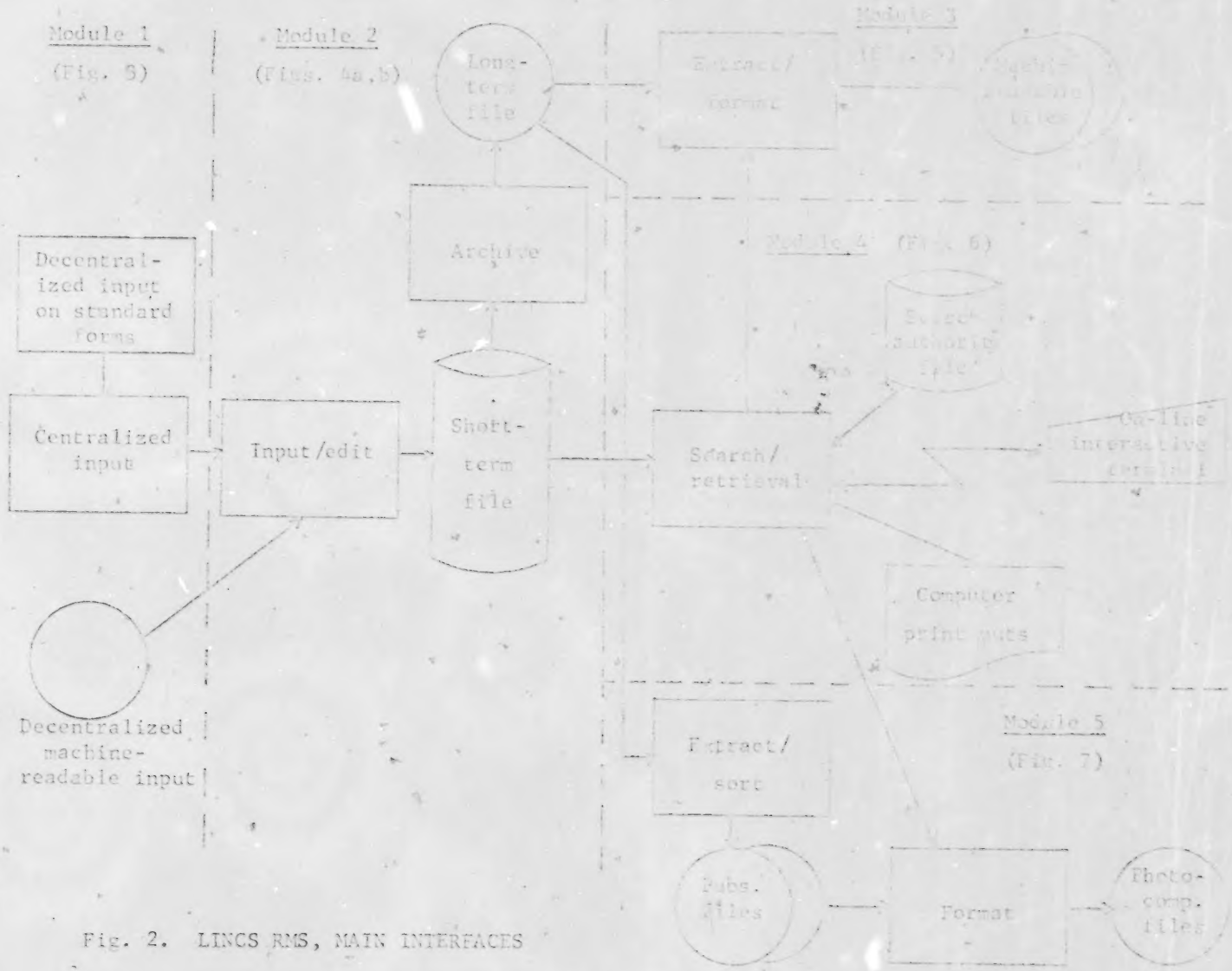


Fig. 2. LINCS RMS, MAIN INTERFACES

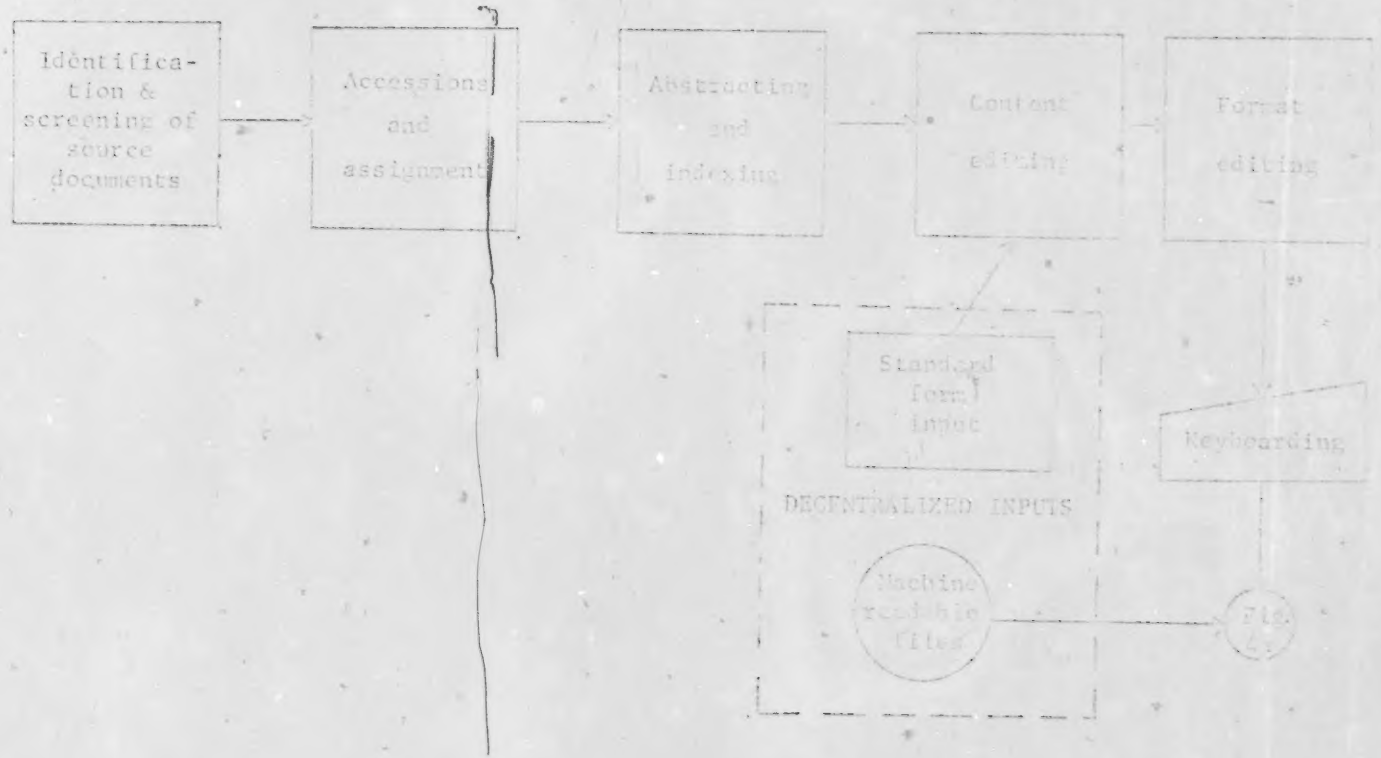


Fig. 3. LINCS RMS MODULE 1: INPUT PROCESSING/UNIT RECORD GENERATION

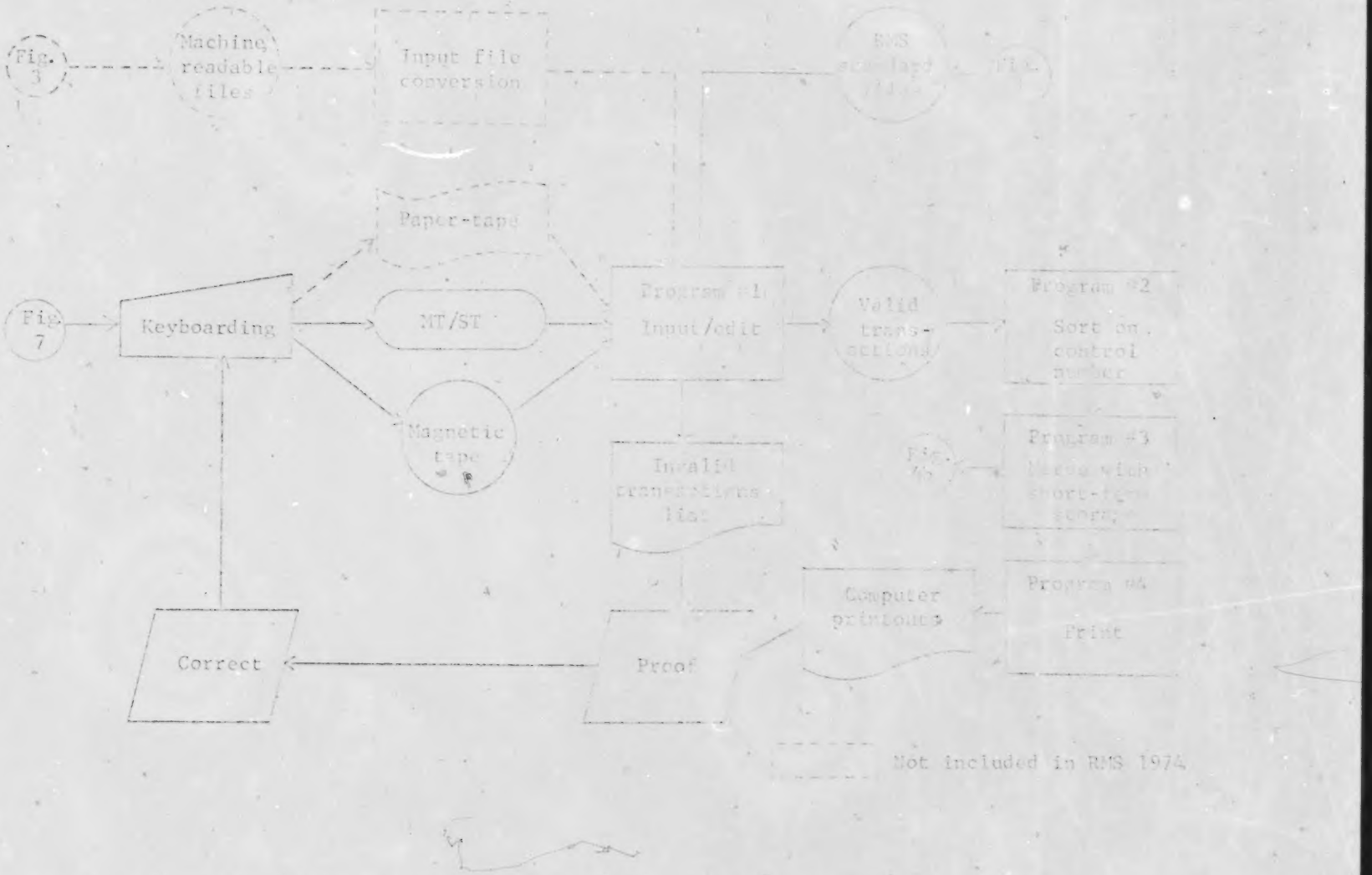


Fig. 4a. LINCS RMS MODULE 2: INTERNAL PROCESSING/REFERENCE FILE MAINTENANCE (INPUT/EDIT)

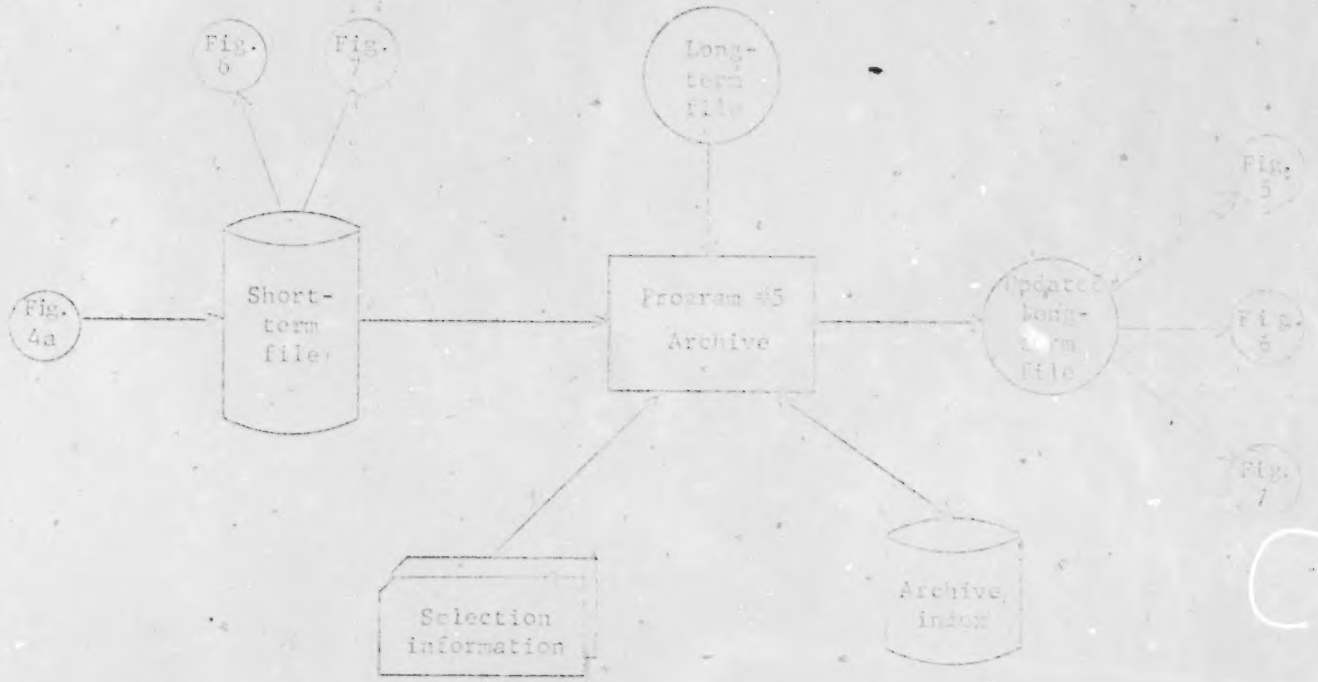


Fig. 4b. LINCS RMS MODULE 2: INTERNAL PROCESSING/REFERENCE FILE MAINTENANCE (STORAGE)

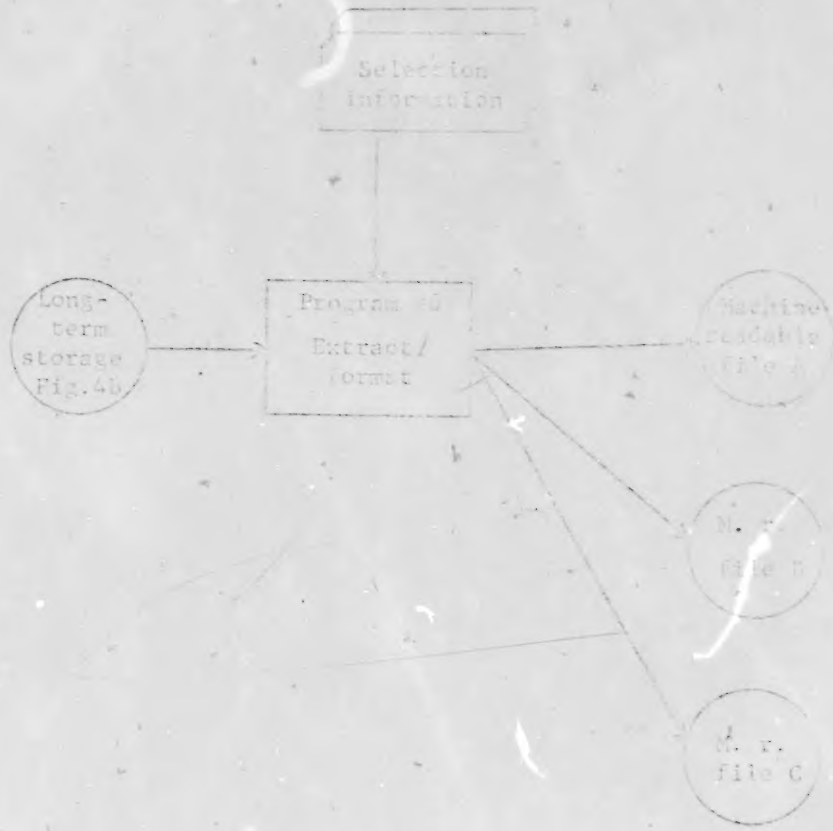


Fig. 5. LINCS RMS MODULE 3: OUTPUT PROCESSING/TAPE DISSEMINATION

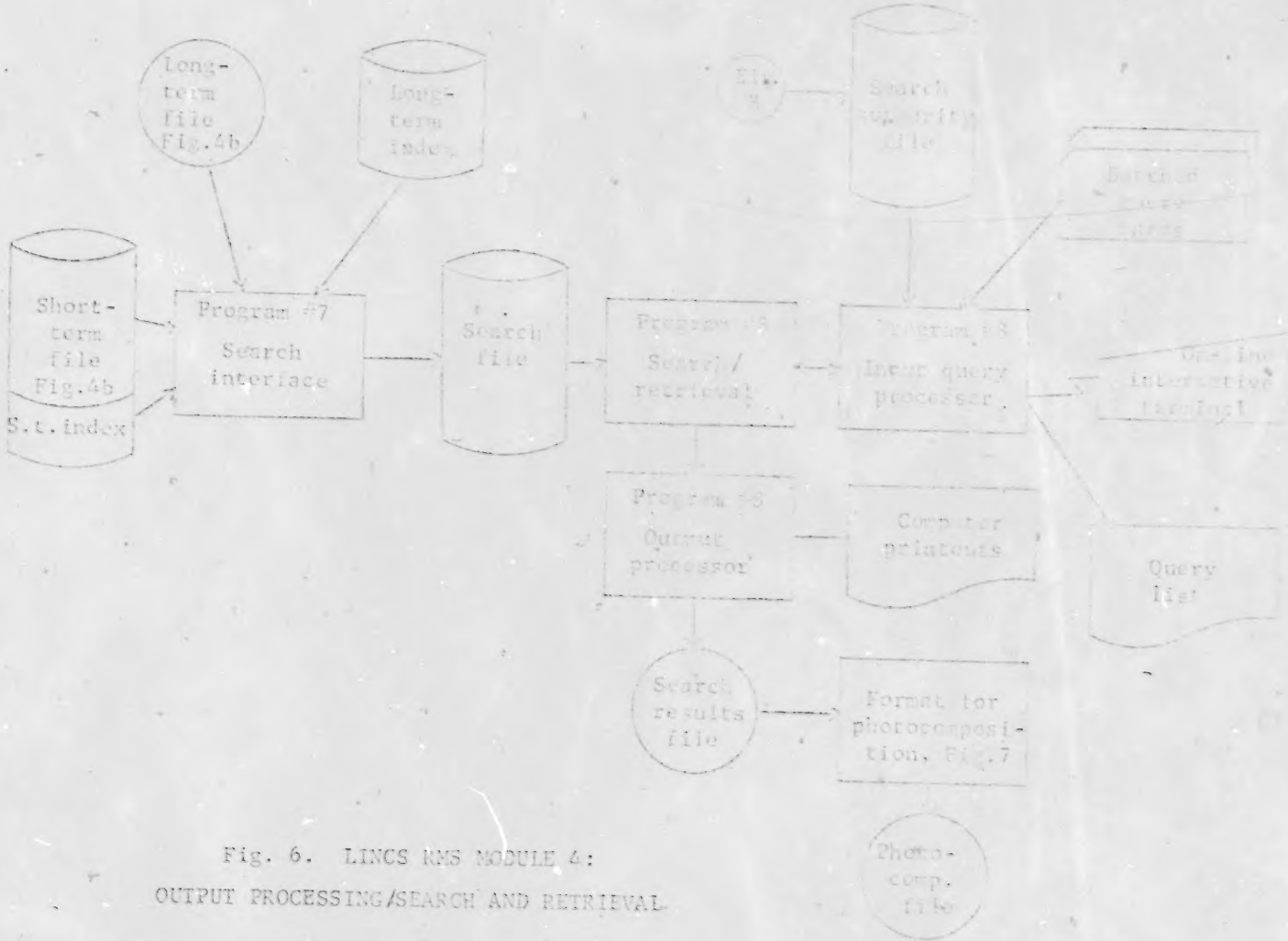


Fig. 6. LINCS RMS MODULE 4:
OUTPUT PROCESSING/SEARCH AND RETRIEVAL

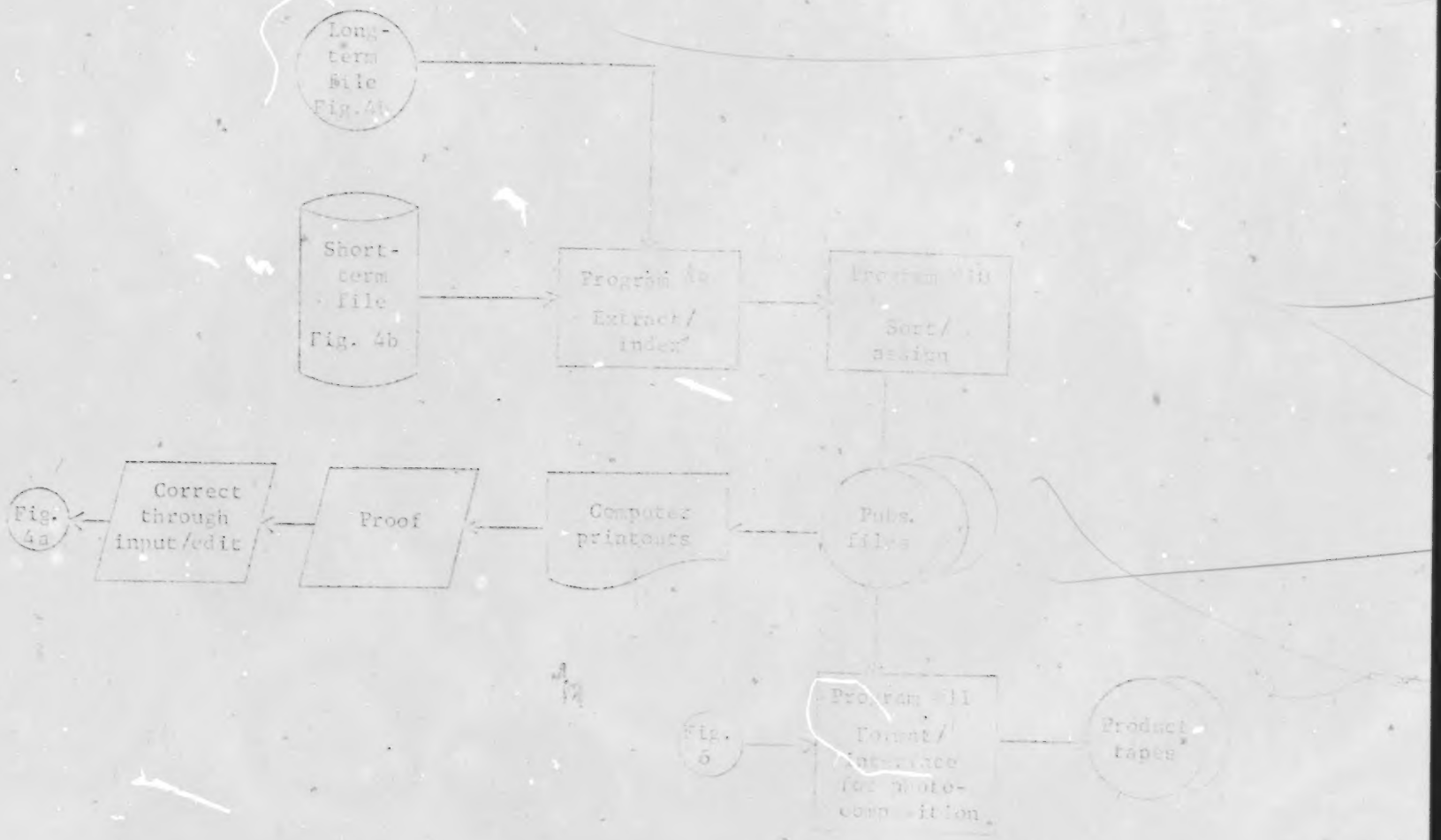


Fig. 7. LINCS RMS MODULE 5: OUTPUT PROCESSING/PUBLICATION

Fig. 8. LINUS RMS MODULE 6: AUTHORITY FILE MAINTENANCE

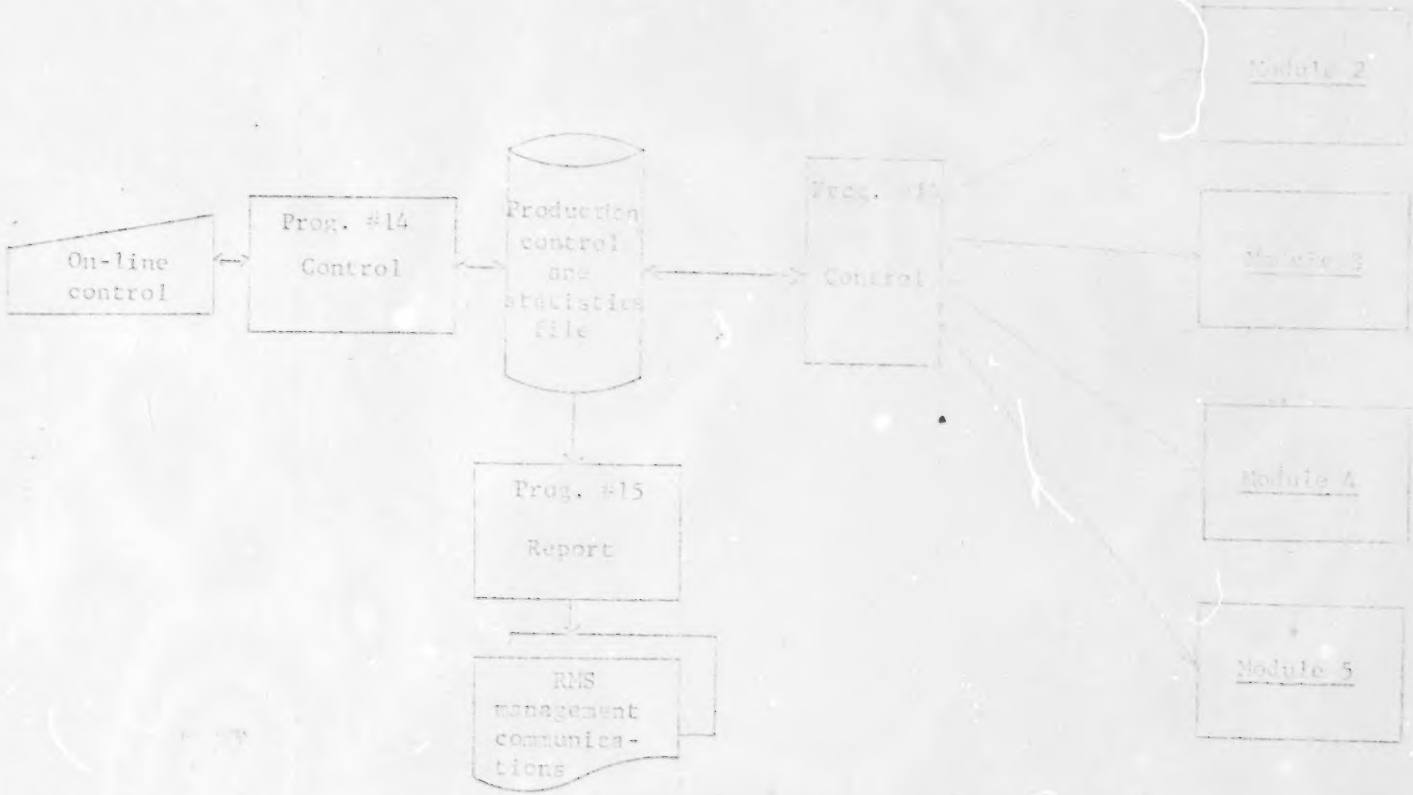


Fig. 9. LINCS RMS MODULE 7: COMMUNICATION/CONTROL

ANNEX C

Language, Society, and Education

Initial priorities of 1972 include the CAL's plan for operational testing of Language, Society, and Education, a specialized reference serial which has been proposed for initiation by 1974. The overall goal is operation with full cost recovery from product sales. The main outcome will be operational test results assessing the economic viability of Language, Society, and Education, an urgently needed abstracting/indexing serial of the CAL, with specialized coverage of sociolinguistics and related theoretical, descriptive, and educational aspects of linguistic diversity. The results will include specific cost, income, price, and demand information toward decisions involving the continuity of Language, Society, and Education after 1975. The project will also yield test issues of Language, Society, and Education.

The overall strategy for operational testing of Language, Society, and Education provides for (1) a predetermined ceiling on all costs, (2) a break-even price structure determined initially in relation to demand expected by 1975, (3) test production and marketing designed to secure the projected demand, (4) continuous evaluation of relevant variables, and (5) adjustments within directly controllable parameters, such as price, if this proves necessary to ensure economic viability in the light of new information. A prognostic decision model including cost/performance/benefit parameters will be developed and used from the outset. The procedures will include free distribution of introductory sample issues of Language, Society, and Education, the sale of regular issues in two annual volumes (1972, 1973), vigorous promotion, a sample user survey, continued interaction with the advisory mechanism, and documentation of all evaluation results.

In response to urgent requests from the language sciences community, Language, Society, and Education was designed as a product which will consolidate and continue the CAL's extensive secondary coverage in sociolinguistics on a regular basis. Key subject specialists have agreed to serve on its Editorial Advisory Board. The partial processing and publishing capability resulting from the Language and Automation [40] prototype activity under NSF grant GN-771 is operationally ready for Language, Society, and Education which will have the same graphic format as Language and Automation.

The initial subject scope of Language, Society, and Education is specified in the table of contents for 1972 (presented below). Subject categories were defined in careful consultation with leading researchers in sociolinguistics. Agreements were reached with editors of secondary publications to avoid major output duplications.

Since the sociolinguistic literature is scattered over a large number of journals from many countries, careful quality control will be exercised in its selection. Some 900 journals have been identified for comprehensive or selective coverage to 1978. The volume for 1972 will have six (bimonthly) issues to provide a high degree of current awareness. Some 2,000 citations will be published in each of the initial volumes. Coverage will include all types of documents from journal articles to books and reports originating from worldwide sources. A network of cooperating institutions will provide voluntary assistance for this purpose.

Language, Society, and Education Types Covered*

Preface

Cooperating Institutions

Document Availability

Periodicals Listed

Subject Categories

General

Social Dialects: Description and Theory

Social Dialects and Education

Bilingualism: Description and Theory

Bilingualism and Education

Contrastive Linguistics

Language, Culture, and Communication

Language Situations

Pidgins and Creoles

Language Planning

Language and Literacy

Language Education: Theory, Method, and Technology (Relevant Aspects)

Theoretical and Descriptive Linguistics (Selections)

Language Sciences (Selections)

Related Fields and Applications (Selections)

Language Education Materials

* Subject to continuous modification in the light of changing user requirements and productive groupings of the literature available for coverage.

Reviews

Extended availability

Serial Announcements

Research in Progress (Project Reports)

Language List

Spatial/thematic reviews of selected languages of the world.

Subject Index (Including Cumulative Annual Index)

Author Index (Including Cumulative Annual Index)

Language and Automation

Initial LINCS priorities also include the CAL's plan for operational testing of Language and Automation, which has been suggested for implementation by 1972. Language and Automation is an urgently needed abstracting/indexing service of the CAL, specialized in computational linguistics and other fields related to automatic language processing. The objective and approach of this project will be essentially the same as those of the Language, Society, and Education project outlined in Appendix C.

In response to recommendations from the Association for Computational Linguistics and the professional community at large, the CAL began to prepare the selective Annotated Bibliography in Computational Linguistics on an emergency basis in September 1968. However, with the limited resources available, the community's requirements could not be met effectively in this fashion. The Association's Documentation Committee began to articulate the community's needs in more specific terms; it became clear that a more substantial approach was called for.

At the same time, the CAL's LINCS definition effort supported by NSF Grant GN-771 relied on a limited prototype experiment in modern secondary processing and publishing to provide realistic information toward the overall system design. It was therefore decided to meet the two requirements -- a specialized secondary service and system design data -- in the same prototype experiment under NSF Grant GN-771: the 1970 volume of Language and Automation [40] was published by the CAL in response to these requirements.

The Documentation Committee of the Association for Computational Linguistics has continued to guide the CAL in the matter of user preferences. Publication of Language and Automation was initiated in the spring of 1970 under formal auspices of the International Committee on Computational Linguistics. An International Editorial Advisory Board has provided specific technical advice on subject scope and overall treatment. Special precautions were taken -- in close consultation with other publishers -- to avoid major duplications. The central emphasis of Language and Automation is unique -- language considered from the vantage point of computational linguistics. Other relevant areas are covered selectively. Some 200 journals were covered in the initial volume (see journal listing, pp. v-xvi, Language and Automation, 1970, #4 [40]). A total of 1,665 entries was published. The coverage included all types of documents from journal articles to books and reports originating from world-wide sources. In the volumes proposed for operational testing (1972, 1973), coverage will be expanded to about 400 journals, many of which will be of a

"permanent" hard-to-locate type. Over 2,400 entries per volume will be published. The subject scope and contents of entries will be improved as noted in the following Table of Contents for 1972. The volume for 1972 will have six thematically linked issues stressing current awareness. The network of cooperating institutions will be strengthened to provide better coverage for Linguistics and Information.

Language and Information 1972: Contents

Preface

Cooperating Institutions

Document Availability

Periodicals Cited

Subject Categories

- General
- Linguistics and Communication
- Mechanical Translation
- Quantitative Linguistics
- Computer Sciences (Relevant Aspects)
- Information Science (Relevant Aspects)
- Theoretical Linguistics (Selections)
- Languages (Automation Studies)
- Machine Aided Language Learning
- Automation in the Humanities and Social Sciences (Selections)
- Language Sciences (Selections)
- Related Fields and Applications (Selections)
- Machine-Usable Materials

Reviews

Extended Availability

Serial Announcements

Research in Progress (Project Resumes)

Subject Index (including Cumulative Annual Index)

Author Index (including Cumulative Annual Index)

APPENDIX C

SPECIAL INFORMATION DIRECTORIES FOR THE LANGUAGE SCIENCES

Also included in the initial publications of LINCS is the CAL's plan for operational testing of six recurrent special information directories for the language sciences which has been proposed for implementation by 1974. Each project will have essentially the same objective and approach as those envisioned for the Language, Society, and Education project described in Appendix G.

During 1973-1975 two annual volumes will be published and tested for each of the following six directories of the CAL, which are needed urgently in the language sciences:

1. Research Projects in Progress, a comprehensive semiannual index to current research projects in the language sciences [39].

2. Information Resources, a comprehensive annual reference guide to information organizational programs, degrees, course offerings, and faculty in the language sciences [38].

3. Language Profiles, an inventory series covering macroanalytic descriptive and statistical characteristics of selected languages of the world, with selected bibliographic references.

4. Serials in the Language Sciences, an inventory series covering principal characteristics and availability of American and foreign serials in the language sciences.

5. Information Services in the Language Sciences, a recurrent inventory of information processing, analysis, and referral centers in the language sciences [8].

6. Societies and Committees in the Language Sciences, a recurrent inventory of professional organizations.

Volumes of items 1, 2, and 5 were published on earlier occasions. The remaining items will be published from existing files which will be further improved.

APPENDIX F

MLA International Bibliography Computerization

In the light of discussions to aid collaboration within the LINCS framework, the Modern Language Association (MLA) has developed a project plan for improved operations of the Linguistics Division of its MLA International Bibliography. Under favorable circumstances, project activities leading to eventual computer viability will begin in 1972.

The Linguistics Division of the MLA Bibliography is a vital tool which provides [illegible] coverage of selected publications in the entire [illegible] Linguistics. Some 3,000 journals and monograph series are scanned by over 200 volunteer bibliographers in the United States and in 30 foreign countries. Recent coverage has yielded about 10,000 entries (42).

Initial goals of the proposed MLA activities include:

- continued compilation, publication, and distribution of the Linguistics Division of the MLA International Bibliography;
- consolidation and improvement of the pattern of bibliographic operations in linguistics which were initially adopted in 1968 by the MLA; and
- utilization of the cooperative exchange of bibliographic data within LINCS.

APPENDIX G

Language and Language Behavior Abstracts

As a result of consultations with the CAL's LINCS project, the University of Michigan has developed plans for a project focused on Language and Language Behavior Abstracts (LLBA). LLBA is a quarterly abstracting journal published by the University of Michigan, which covers more than 1,500 journals and other documents, mainly in psycholinguistics and sociology articles in the socially highly important areas of language and behavior (LLBA).

The goal of the proposed project, which is to begin in 1972, is to preserve LLBA's growth toward financial self-sufficiency, as it takes steps to reduce costs and increase revenues, and to establish closer collaboration with LINCS and other language-sciences information dissemination components. Plans to reduce costs include cooperation with other services to increase the proportion of author-prepared abstracts available and the continued solicitation of complimentary, rather than paid, subscriptions to selected publications; moves to increase revenues include the preparation of a cumulative five-year index and the initiation of annual indexes for future volumes. Editorial work for the journal is done in Paris, France and Ann Arbor, with production contracted to commercial firms.

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